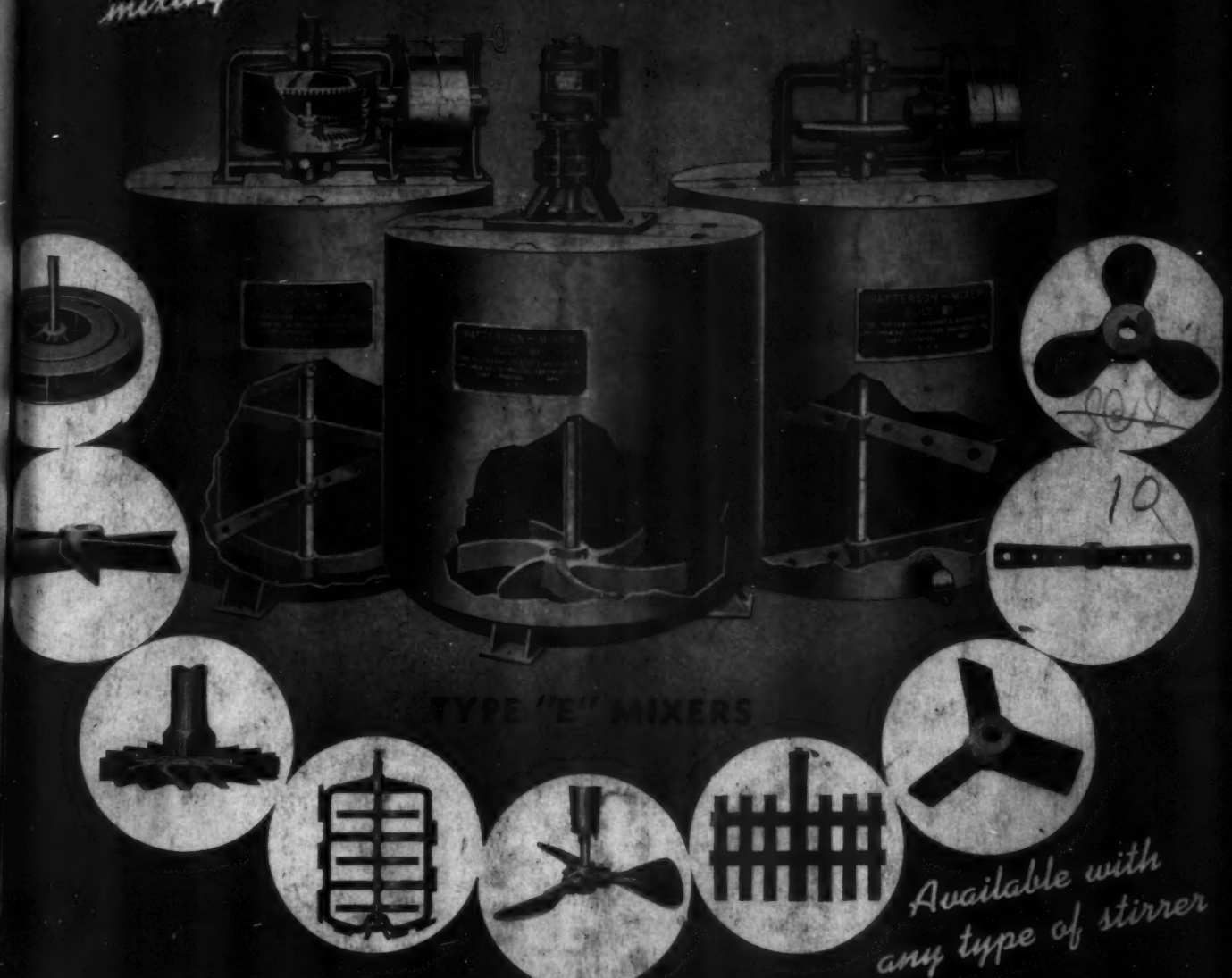
THE PAPER INDUSTRY
and PAPER WORLD

efficient low-cost mixing...

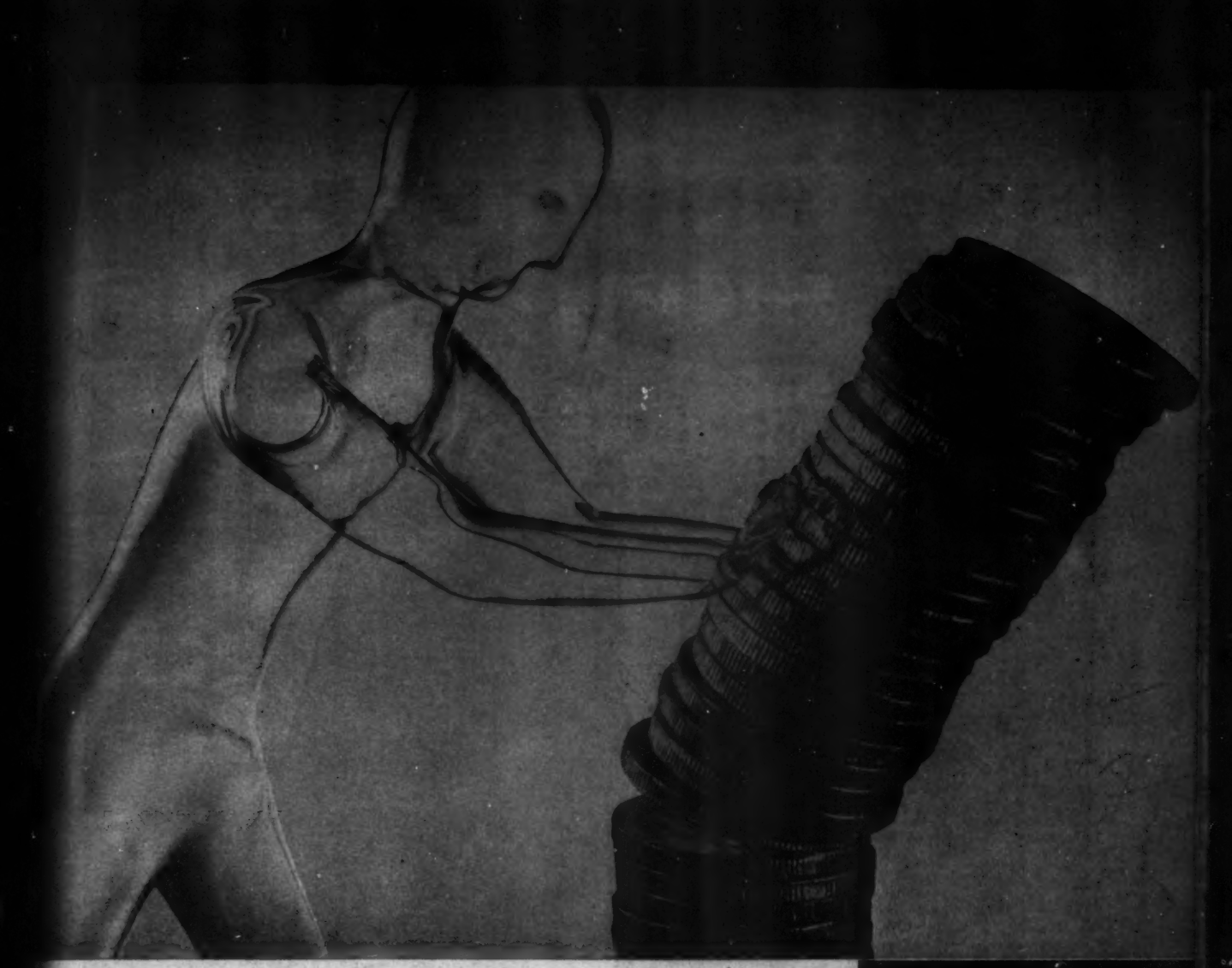
PATTERSON



Available with any type of stirrer

THE PATTERSON FOUNDRY & MACHINE CO.
EAST LIVERPOOL, OHIO, U. S. A.

STANDARD OIL COMPANY'S
NONPAREIL DIESEL OIL
cuts oil consumption 28%
in actual test . . .
Increasing oil life from 7 to 9.7 engine hours per gallon is an astonishing saving in oil. Yet by thorough test under actual operating conditions, Nonpareil Diesel Oil gave over 38% more hours of operation per gallon than a conventional Diesel oil, or a saving of 28% in oil.
The test was made in the power plant of a northern utility company on 800 H.P. Diesel-powered generators. Consumption records were kept for 8,800 hours on a high grade Diesel oil. At the end of this period, Nonpareil Diesel Oil was run for 13,800 hours. Comparison of the records showed that Nonpareil used 28% less oil and in addition gave cleaner operation even over the longer test period.
But you need not take anybody's word for the cost-reducing quality of Nonpareil Diesel Oil. A Standard Lubrication Engineer will be glad to make a test on your equipment and let your records tell the story. Even a short test will show the difference.
Call this Engineer at your local Standard Oil (Ind.) office or write 910 South Michigan Avenue, Chicago, Illinois. His service will cost you nothing.
Copr. 1928, Standard Oil Co.
STANDARD OIL COMPANY (INDIANA)
LUBRICATION ENGINEERING
THE RIGHT LUBRICANT • PROPERLY APPLIED • TO REDUCE COSTS

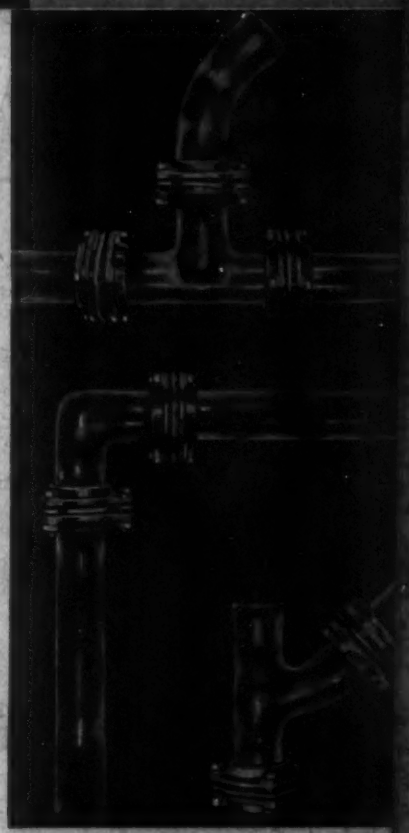


Bring down PIPING COSTS

INSTALL "PYREX" Piping wherever corrosion has been an important cost factor and watch your piping costs come down. Remarkable resistance to all acids and alkalies in solution (except concentrated HF) is largely responsible for the longer life and economy of "PYREX" Piping.

Other cost reducing factors include: proven mechanical strength necessary for practical industrial use; resistance to thermal shock that would instantly shatter ordinary glass; a hard smooth surface which resists abrasion; and visibility that reveals the pipe and its contents.

Look over your piping replacements and then ask Corning Engineers to show you how you can save money by installing "PYREX" pipe lines.



Use "PYREX" Piping as insurance against corrosion. Its long life and ultimate economy will amply repay you.

PYREX

CORNING GLASS WORKS

CORNING N. Y.

"PYREX" is a registered trade-mark and indicates manufacture by Corning Glass Works

GLASS REVEALS BOTH ITS MAKE-UP AND ITS CONTENTS

CONFIDENCE IS REFLECTED IN REPEAT ORDERS FOR SKF ON BEATERS

BUILT BY E. D. JONES & SONS, INC.

SKF-EQUIPPED

CONFIDENCE . . . that's why Jones selected SKF Spherical Roller Bearings to take shock loads and compensate for erratic jumping on this Beater. Because they've used SKF before, they expect . . . and GET . . . the same profit-paying performance on this beater that for years has characterized the use of SKF Bearings on paper mill machinery of all kinds.

The entire paper industry feels the same way about SKF, too, for practically every paper mill in the world uses SKF Bearings in one or more locations. We are proud of this tribute to skilled workmen and precision machines that produce a never-varying high quality of bearings. If you use SKF Bearings this year, you'll be using them for many years to come.

SKF INDUSTRIES, INC.
Front St. & Erie Ave. Phila., Pa.

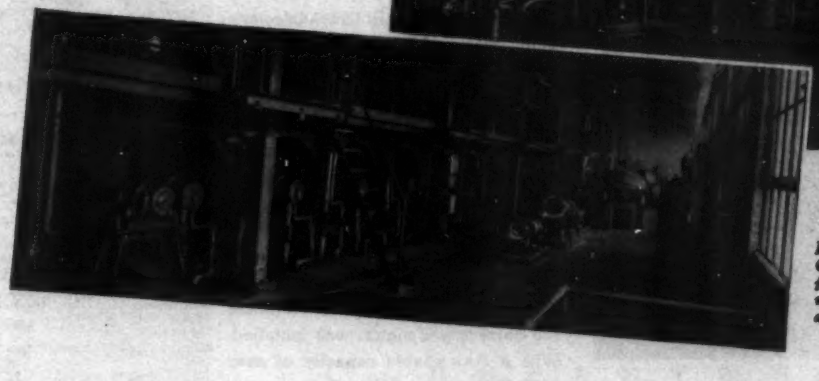
4147

SKF makes more types and sizes of ball and roller bearings than any other manufacturer in the world.

SLUDGING OVERCOME

Overnight!

These dryer roll bearings are lubricated with Texaco Ursa Oil . . . have been for more than five years. The entire mill is Texaco lubricated.



In circulating systems, Texaco Ursa Oil remains stable under heat and pressure. Keeps oil lines clean, provides a flood of lubricant that cools as well as lubricates.

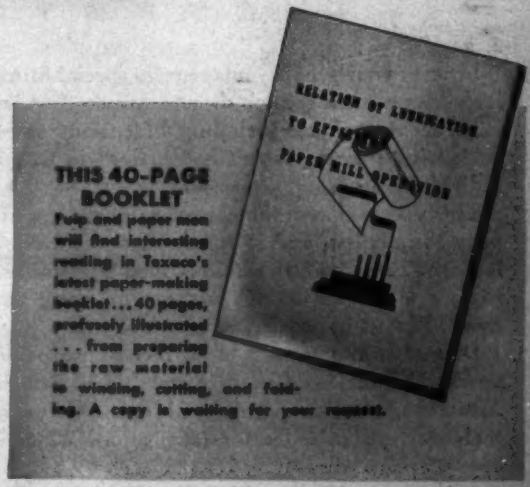
IT HAPPENS ALL THE WHILE . . . this time in a big southern mill.* Frequently this mill had to shut down, to remove a sludgy deposit from the oil circulating system.

Switching to Texaco Ursa Oil, this trouble was immediately overcome. As a result of this, other Texaco Lubricants were added until this mill is now Texaco lubricated . . . 100%.

Changing over to Texaco might effect a similar saving in *your* mill. Why not find out?

Trained lubrication engineers will aid you in the selection and application of Texaco Paper Mill Lubricants through 2108 warehouse plants throughout the United States. Call your nearest Texaco warehouse, or write The Texas Company, 135 E. 42nd St., N. Y. C.

*Name upon request.



THIS 40-PAGE BOOKLET

Pulp and paper men will find interesting reading in Texaco's latest paper-making booklet . . . 40 pages, profusely illustrated . . . from preparing the raw material to winding, cutting, and folding. A copy is waiting for your request.

TEXACO *Ursa Oils*

FOR CIRCULATING SYSTEMS

PIPE FITTINGS

"TAILORED" TO YOUR NEEDS

Whenever your pipe layouts require special fittings, it's easier to turn the job over to Armco. Just send us an accurate sketch including dimensions, and let us fabricate these difficult connections to fit your individual needs.

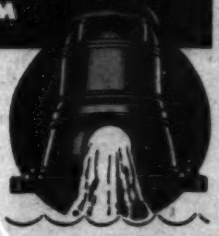
This way you save the cost of extra flanges, simplify installation, and lessen the chances for joint leakage. Then too, you'll find Armco "streamlined" piping much easier to support or hang than assemblies with greater weight and more joints.

Diameters run from 6 to 36 inches; wall thicknesses 12 gage to ½-inch. Available in durable ARMCO Ingot Iron or steel—with optional coatings including galvanized after fabrication. Write for free 42-page pipe book No. 337. The American Rolling Mill Co., Pipe Sales Division, 1871 Curtis St., Middletown, O.

ARMCO

ARMCO

SPIRAL WELDED PIPE



WITH a water cost ranging from $40,000 to $50,000 a year, and possessing six unsatisfactory wells, the world-wide famous Allis-Chalmers Manufacturing Company, of Milwaukee, turned to Layne for a dependable, low cost water supply. The contract called for a minimum of 700 gallons per minute. Beginning with a sixteen-inch casing, The Layne Northwest Co. of Milwaukee (Affiliated Company of Layne & Bowler, Inc.) drilled to 1700 feet. A Layne Pump, operated by an Allis-Chalmers 100 horsepower motor, was installed. With a dependable capacity of near 1,700,000 gallons daily, their water is now being obtained at only 15% of former cost. Annual savings easily exceed $30,000.

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INTERNATIONAL WATER SUPPLY, LTD., LONDON, ONTARIO, CANADA

Such records of savings from Layne Wells and Pumps are frequent occurrences. More and more manufacturers and municipalities, worried with growing costs in all divisions, are seeking a lower cost water supply. Just how much you may be able to save on water cost can be answered by our engineers. There is no obligation for their cooperation. Write. For Literature, address LAYNE & BOWLER, INC., DEPT. P, Memphis, Tenn.

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PUMPS & WELL WATER SYSTEMS

For Municipalities, Industries, Railroads, Mines and Irrigation

THE PAPER INDUSTRY and PAPER WORLD

VOLUME 20 . NUMBER 5 AUGUST, 1938

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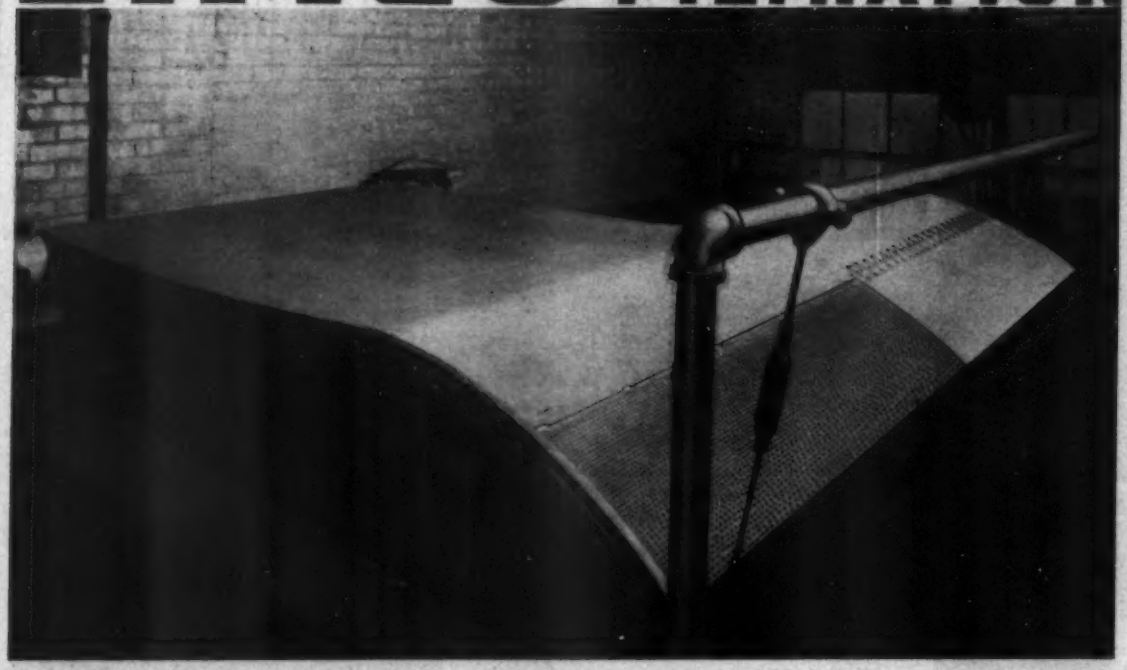
EIMCO PAPER PULP FILTRATION



SAVES: on installation cost ... on operating cost . on maintenance cost

New-feature Perforated-Metal Grid, illustrated above, does away with wire windings—minimizes sliming—eliminates necessity for steaming or high-pressure washing except at periodic shutdowns. Discarded cylinder wire from paper-making machines is used efficiently for facing wire—applied in any available lengths, under brake-roller tension (as shown above) and spot-soldered to perforated metal grid.

Float-controlled Variable-speed Drum Drive and Externally-Adjusted Automatic Valve combine to give high "Save-All" efficiency at capacities ranging from 1½ to as much as 4 gallons per square foot of filtering surface per minute. Pulp losses—over period of year—average less than ½-pound per thousand gallons of whitewater.

Simplified Electric-Welded Tank and Frame Construction reduces both first cost and installation cost to new low levels—assures permanent alignment—minimizes maintenance expense.

Many other money-saving features found only in EIMCO Savealls, Saveall-Deckers, Thickeners, Washers, etc., are illustrated and described in Bulletin 405. Write for it today or use the convenient coupon.

THE EIMCO CORPORATION

634 So. 4th West — Salt Lake City, Utah

U. S. A.

NEW YORK — CHICAGO

EL PASO — SAN FRANCISCO

NOTE: Inquiries from Middle Western States and Central Canada should be addressed to our Chicago Branch Office, 333 N. Michigan Ave.

THE EIMCO CORP., Salt Lake City, Utah, U. S. A.

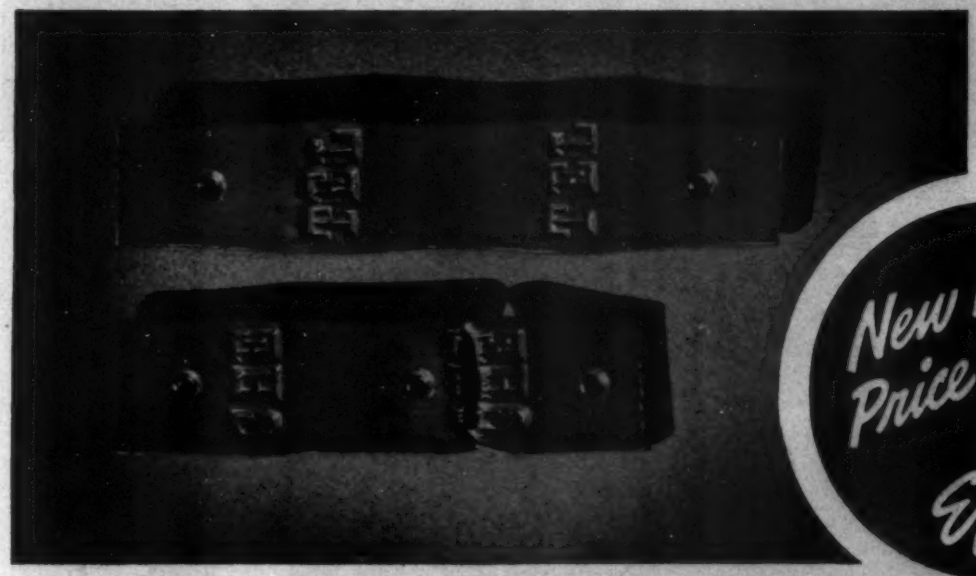
Gentlemen: I am interested in your modern new feature continuous vacuum filters for paper-pulp service and would like to receive Bulletin 405, with the understanding that no charge or obligation of any kind will be incurred.

Name of individual — *Position or title*

Name of company

Mailing address

The Lead that strengthens with strain



Strips of Tellurium Lead (above) and lead without Tellurium content (below) stamped and then pulled out at equal rates in a tensile strength testing machine. Note how the Tellurium Lead has developed strength, due to work-hardening at the stamping—whereas the other lead was weakened and broke in two.

WHEN a man has real strength of character, hard knocks help bring it out.

Tellurium Lead is like that. *It gets tougher under stress. It work-hardens.* Service reports from a large number of users agree that bending, stretching or hammering actually tend to make this lead stronger. This means that turn-over points and joints are less subject to cracking.

Furthermore, where vibration occurs, this capacity to develop latent strength minimizes buckling and creeping. And when heat changes are frequent and rapid, Tellurium Lead gives improved resistance to fracture.

The other outstanding advantage of Tellurium Lead is this: It gives increased resistance to sulphuric and other corrosive acids, even at temperatures that tend to approach the melting point of the metal. In plant after plant, it has prolonged the useful life of equipment . . . and reduced the number of shut-downs for repairs.

Tellurium Lead of our manufacture is time-tried St. Joe chemical lead alloyed with a small quantity of tellurium. It gives the advantage of this well-known chemical lead plus important new ones. Yet now, due to a price reduction, it costs only a fraction of a cent more per pound than chemical lead. Available in sheets, pipe and coils. For further facts, write to nearest branch.

Courtesy O. G. Kelley & Co.

Tellurium Lead is now extensively used to line tanks and for pipes and coils, in plants handling sulphuric and sulphurous acids, hot chrome solutions, copper sulphite solutions, chlorine gas, hydrochloric acid fumes and hydrofluoric acid.

No Buckling

"We recently made an inspection," a manufacturer writes, "of our large sulphuric acid mixing tank that was lined with Tellurium sheet lead in March 1934. We found the lead to be smooth and uniform with no signs whatever of buckling, although this tank is used for mixing raw acid to lower specific gravities."

Withstands Higher Temperature

"We have for the last three years used Tellurium Lead," another user reports, "in 6 to 10% sulphuric acid with ½ of 1% hydrochloric acid. All the tubing we have purchased is still in use and in excellent condition. We use Tellurium Lead because it is stronger and will withstand a higher temperature."

NATIONAL LEAD COMPANY

New York, Baltimore, Buffalo, Chicago, Cleveland, Cincinnati, St. Louis; National-Boston Lead Co., Boston; John T. Lewis & Bros. Co., Philadelphia; National Lead & Oil Co., Pittsburgh; Georgia Lead Works, Atlanta; Gibson & Price Co., Cleveland; American Lead Corporation, Indianapolis; Morris P. Kirk & Son, Inc., Los Angeles; Master Metals, Inc., Cleveland; The Canada Metal Company, Ltd., Toronto, Montreal, Winnipeg, Vancouver.

Tellurium Lead

SPEED . . . without human error

The **SEYBOLD** *— for paper mill, specialty paper makers and paper converters*

The SEYBOLD PRECISION MILL AUTOMATIC SPACER PAPER CUTTER promotes speedy action in the trimming and splitting of piles without the inaccuracies of manual operation and measurements. Paper Mills need this modern approach to profitable mill trimming and repeat cutting.

On the SEYBOLD MILL SPACER CUTTER the back gauge moves instantly to the next desired cutting position and stops automatically.

Valuable time of the operator and of the machine is saved by eliminating the possibility of human error in repeat calculations. Actually a dual purpose machine. A snap of the switch converts it to a standard trimmer.

Other Products by Seybold . . .

Book Compressors
Book Trimmers
Cutting Machines
Drilling Machines
Knife Grinders
Die Presses
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Stamping Presses
Wire Stitchers

SEYBOLD • DIVISION : HARRIS •

SEYBOLD • • PIONEER BUILDERS OF

A Keen Knife

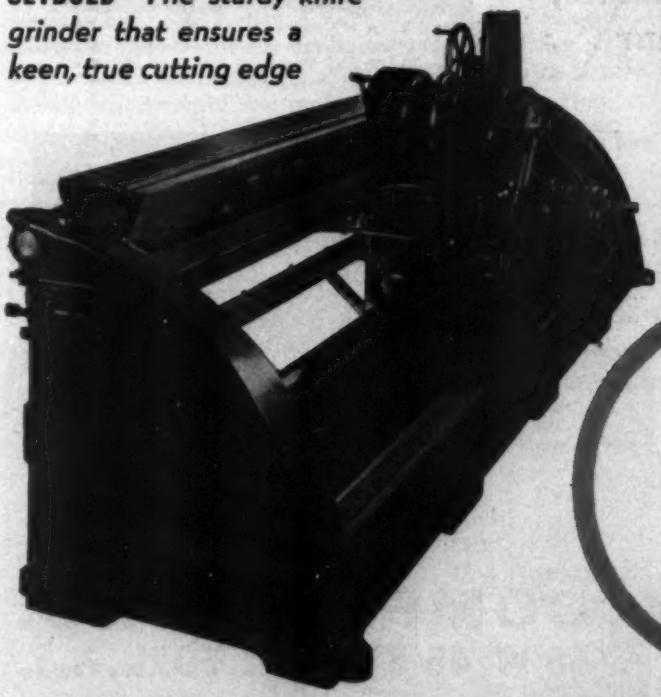
MAKES THE ACCURATE CUT *and it must be*

Precision GROUND . .

Needless to say, accurate trims or cuts are not made with knives of uneven cutting edge. The shearing power of any cutting equipment, no matter how rigid or how engineered, loses its efficiency when the knife is out of true balance.

Cutting knives must not only be sharp—they must be accurately beveled, with a true, straight edge end to end. The SEYBOLD Automatic knife grinder is a product of precision engineering and grinds rapidly and truly any kind of bevel on any kind of straight edge.

★
SEYBOLD—*The sturdy knife grinder that ensures a keen, true cutting edge*



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- Latin America & West Indies: National Paper and Type Co., Inc.

+SEYBOLD++POTTER CO. *Dayton Ohio*

SUCCESSFUL CUTTING EQUIPMENT

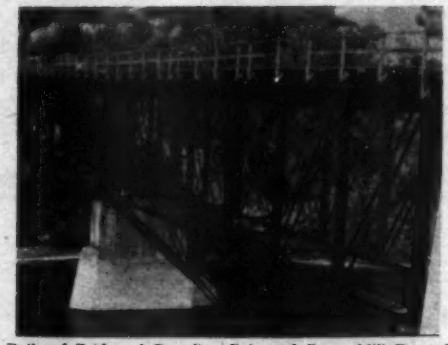
Penstock 9-ft. Diam., 1250 ft. Long, of Large Eastern Paper Mill. Protected by TRIPLE-A No. 10 Black.

Western Pulp and Paper Mill. Pipe Lines, Structural Steel, Dado and Walls Coated With TRIPLE-A No. 10 Black. All Pipe Lines With Asbestos Covering Coated With TRIPLE-A No. 44, Aluminum.

Terrific Jolt Given Rust by

QUIGLEY TRIPLE-A PROTECTIVE COATINGS

Shield Steelwork from Ruinous Action of Steam, Moisture, Acids, Alkalies, Fumes of Chlorine, Sulphur Dioxide, etc.



Railroad Bridge of Canadian Pulp and Paper Mill Treated With TRIPLE-A No. 10 Black. Before Adopting TRIPLE-A, Owners Had Trouble With Corrosion From Mill Fumes—None Thereafter.

TRIPLE-A differs from paints *in both pigment and vehicle* —gives greater protection, has greater tenacity. It penetrates pits and pores, where corrosion starts; forms a tough, durable protective film; resists abrasion and heat. CAN BE APPLIED TO DAMP SURFACES. Made in Black, White, Colors and Aluminum.

Here is super-protection for exposed metal work in mill and boiler house—conveying machinery, beaters, acid towers, digestors, piping, cranes, conduits, bleaching tanks, mash towers, dryers, sprinkler systems, and other equipment, floors, walls, sash, boiler fronts, stacks, breechings, tanks.

Write for Bulletin 275 P. I.

Northern Pulp and Paper Mill. All Pipes Protected With TRIPLE-A No. 10 Black, Wood and Metal Tanks, Structural Steel Coated With TRIPLE-A No. 130 Gray.

QUIGLEY COMPANY, INC.
56 W. 45 ST., NEW YORK, N. Y.

Makers of HYTEMPITE *"The World's Standard High Temperature Cement"* · SPECIFICATION FIRE BRICK · INSULBRIX INSULAG · INSULBLOX · INSULCRETE · Q-CHROMASTIC · Q-CHROME · HEARTH-CRETE · CAST-REFRACT MONO-LINE · ACID-PROOF CEMENTS · QUIGLEY REFRACTORY GUN · Q-SEAL · DAMIT · *ANNITE*

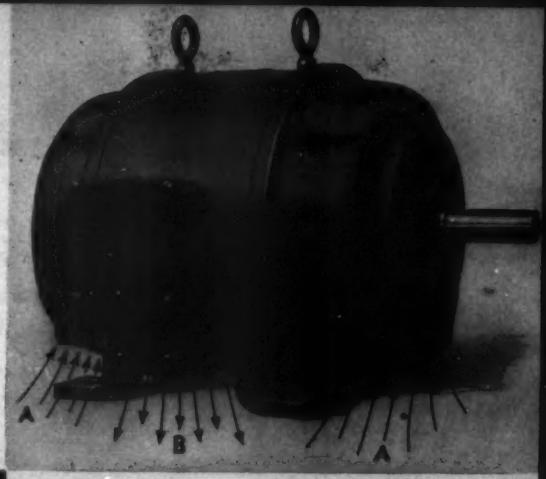
Distributors with Stocks and Service in Important Industrial Centers Throughout the United States, Canada, and in 32 Other Countries.
In Canada, Quigley Company of Canada, Limited, Lachine, P. Q.

STOCK-PUMP motors must take a good sousing like this at clean-up time. There's no worry about damaging windings when splash-proof Reliance Motors are used. You can squirt water at them from any angle and it does no harm.

The protective features in these motors are effective aids in reducing maintenance and prolonging motor life. They fit today's idea of maintenance which lays its emphasis on *preventing* instead of fixing trouble.

RELIANCE ELECTRIC & ENGINEERING CO.
1088 Ivanhoe Road Cleveland, Ohio

Branches: Birmingham, Boston, Buffalo, Chicago, Cincinnati, Detroit, Greenville (S. C.), New York, Philadelphia, Pittsburgh, Syracuse (N. Y.). *Representatives in other principal cities.*



↑
Splash-proof Type AA Squirrel-cage Reliance Motor. Air enters through intakes "A" "A", circulates over coil heads and stator core and leaves through opening "B". Outlet box is watertight. . . . The same ratings are developed as in corresponding open frame sizes. Mounting dimensions are identical. The difference in weight is negligible. Bulletin 122.

←
75 hp. Splash-proof A-c. Reliance Motors driving stock-pumps in one of the new southern mills.

RELIANCE A-C D-C MOTORS

ALL PAPER MANUFACTURERS are familiar with the cry for low prices. To the makers of strawboard it is the "every day" appeal. Strawboard is generally considered a "non-profit" item with those who purchase it. Whether used as liners or wrappers, or, as illustrated above, for backing scratch pads, strawboard must be both good and inexpensive. » » It is more than coincidence that leading manufacturers of strawboard equally with those of the finest writing and printing papers, rely on Hamilton Felts for economical operation of their paper machines. Regardless of the furnish, whether it be coarse or fine, Hamilton Felts remove the water at higher speed and lower cost and they improve the texture and finish of the product. Prove for yourself how much longer they last and how much less they cost per ton of production.

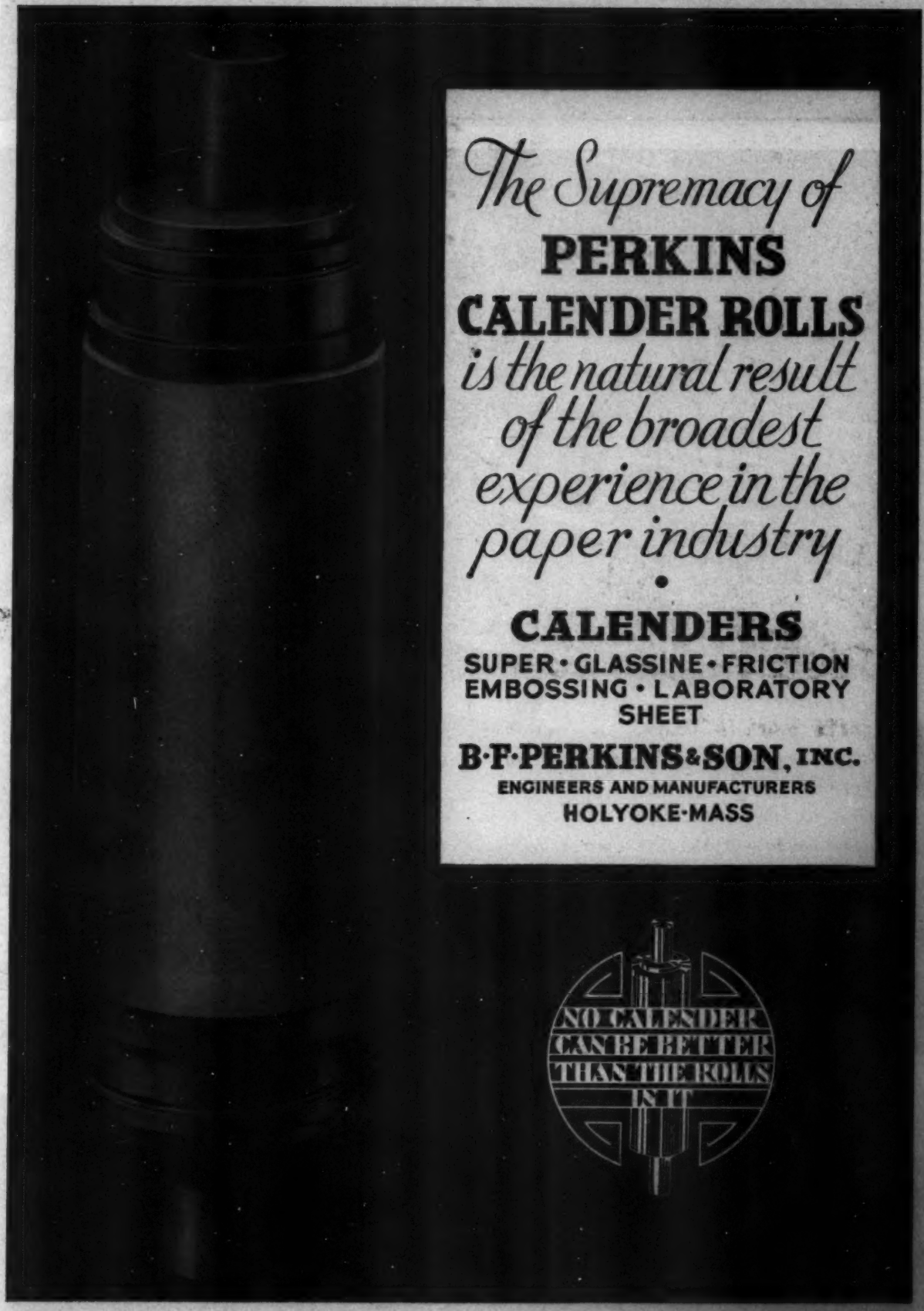
• *From the thinnest tissue to the heaviest boards there is a Hamilton Felt that will do your work better, faster and at lower cost.* •

SHULER & BENNINGHOFEN, HAMILTON, OHIO

• Miami Woolen Mills, Established 1858 •

Hamilton Felts are marked by two blue lines full width of the felt and by one shorter blue line midway between them.

Hamilton Felts


The Supremacy of
PERKINS
CALENDER ROLLS
is the natural result
of the broadest
experience in the
paper industry
CALENDERS
SUPER • GLASSINE • FRICTION
EMBOSSING • LABORATORY
SHEET
B·F·PERKINS & SON, INC.
ENGINEERS AND MANUFACTURERS
HOLYOKE·MASS
NO CALENDER
CAN BE BETTER
THAN THE ROLLS
IN IT

See page 518

Perspective

TRADE WINDS

Plan Huge Water Power Project for Wisconsin

WISCONSIN paper manufacturers, most of whom depend upon the Wisconsin and Fox rivers for their water power, will be the major beneficiaries if a plan to build a gigantic combination flood control, pollution abatement and power project wins approval of the Public Works Administration in Washington, D. C. The plan, two years in preparation and calling for a total outlay of $26,000,000 for the development of the Wisconsin and Fox rivers, was presented at the national capital by the Wisconsin Development Authority.

The development, which would involve a system of dams, canals and tunnels, including three new separate hydroelectric developments on the Wisconsin River capable of generating 275,000,000 kilowatt hours of power, and entailing huge reservoirs on the Wolf River and diversion to the Fox River, would increase the potentialities of the manufacturing industry almost indefinitely. An integral part of the system would be the Wisconsin Valley Improvement Company's system of 21 reservoirs now used by paper mills to help control the Wisconsin River during periods of extremely high or low flowage. The last and largest reservoir completed is that of the Big Eau Pleine in Central Wisconsin (cf. *Paper World*, p. 5, July, 1937).

New hydroelectric developments contemplated if the project goes through would be installed at the Knowlton site, below the mouth of the Eau Pleine River; the Petenwell site about 50 miles downstream below Nekoosa, and at Germantown, 12 miles below Petenwell. Thirteen important power sites in the Fox River Valley now generate a total of 17,455 horsepower. The proposed development, the planning board estimates, would increase this total to 53,068. Involved in the projected setup is a diversion canal which would turn water from the Wisconsin River into the Fox River at Portage, where the two streams are but a short distance apart.

The construction program, as graphed by the planning board's engineers, contemplates the following:

1. The construction of a reservoir of very great capacity on the Little Eau Pleine River to store the water of this river and the surplus waters of the Wisconsin River. This reservoir is considered essential to the entire undertaking.

2. The construction of three new hydroelectric power plants on the Wisconsin River below the reservoir at a total estimated cost of $10,950,000.

3. The making of provision for the diversion into the Fox River at Portage of some of the water stored on the Wisconsin River, either by a new canal or by increasing the capacity of the present canal. The amount of the diversion on which the studies were based is 1,500 cubic feet per second for 120 days during the summer and fall.

At present there are 22 plants producing power for existing industry. Their capacities, the board estimates, will be increased by 91 per cent, all of which would be absorbed by existing industries and by proposed new plants.

"The development comprehended by the plan is of unusual merit," the board observed, "In that none of the results of the construction projects in the way of storage of water, flood control, or electric power development are in any sense doubtful. There is ample evidence to justify every conclusion. None of the projects present any unusual or difficult construction problems. The predicted increase in industrial employment is in line with past experience."

In their study of the possibilities of diverting surplus waters from the Wisconsin River to the Fox River at Portage, from where it would flow toward Lake Winnebago and into the lower Fox, engineers found that the Wisconsin is about six feet higher at low stage and about 21 feet higher at high stage than the Fox.

"On the Fox the shortage of water is often very acute in summer," the board pointed out. "Not only is there a shortage of water for power but the cities of Neenah, Menasha, Appleton and Kaukauna, and the villages of Kimberly, Little Chute and Combined Locks, suffer at times from lack of water needed for efficient treatment of their sewage."

The low level of water flow is particularly injurious to the paper manufacturing industry in the Valley, the report said.

"All industry suffers because of a lack of electric power, and the paper manufacturing industry more than the rest. Some of the paper mills are equipped with auxiliary steam plants but not all of them are so fortunate. Those without auxiliary steam power plants must either shut down when the flow of water is too low or they must purchase electric power."

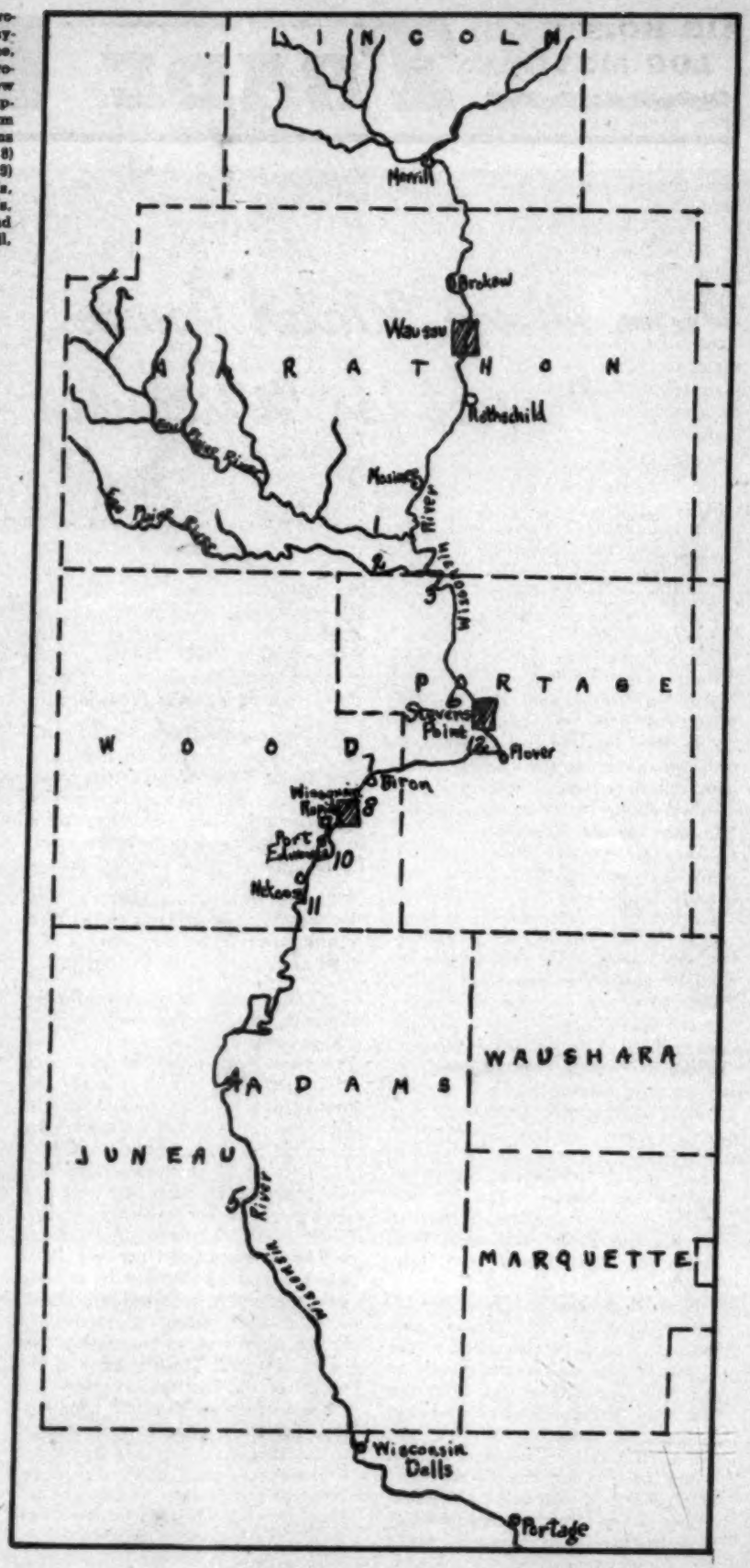
The river flow on the Fox River aided by the Wolf River storage and Wisconsin River diversion would be increased 203 per cent, the planning board said.

"The figures indicate substantial increases in firm horsepower without any additional construction. But it seems quite certain that a considerable amount of modernization will be done to take advantage of the increased firm flow. Also it seems likely that the undeveloped lower Kaukauna site, with the greatest theoretical power of any on the Fox River will be developed if the increased firm flow is made available."

The development, the planning board predicted, would double the employment opportunities in the Fox River paper industry. Benefits for the Wisconsin River areas proper would be even greater, it was said.

If the $26,000,000 entire project is

Points which would be affected by the proposed project are shown on the accompanying map as follows: 1) Big Eau Pleine. 2) Proposed Little Eau Pleine Dam. 3) Proposed dam on Wisconsin River below Knowlton. 4) Proposed dam 1½ miles upstream from Petenwell. 5) Proposed dam just above Germantown. 6) Dam at Stevens Point. 7) Consolidated dam at Biron. 8) Consolidated dam at Wisconsin Rapids. 9) Nekoosa-Edwards dam at Wisconsin Rapids. 10) Nekoosa-Edwards dam at Port Edwards. 11) Nekoosa-Edwards dam at Nekoosa. and 12) Whiting-Plover Paper Co. dam at McDill, just below Stevens Point



approved in its present form, the PWA would contribute the entire cost, 45 per cent as an outright grant and 55 per cent as a loan. The application was received in Washington several weeks ago but the project already has a long history with PWA. On July 11, 1937, PWA received an application from the Hydroelectric Power Company asking for $26,000,000 to build the project. Nine days later the application was revised to provide for a $5,000,000 loan and grant but this time the applicant was listed as the Wisconsin River Flood Control Board . . . "when, as and if organized under the Wisconsin Public Service Commission."

Reservations have been made at the Wisconsin secretary of state's office in Madison for incorporation of the Wisconsin Hydro Authority, protecting the name of the authority against infringement.

◆

ABITIBI NEWS

Some rumors have been in circulation to the effect that certain holders of Abitibi Power and Paper Company bonds and preferred shares have been holding informal discussions regarding ways and means of getting together in a new effort to reorganize the company. According to reports, one important security holder has been sounding out one institution on its attitude, but apart from this, it cannot be established that any steps have been taken as yet to form what might be called a committee of all the committees.

Not much progress has been made on the proposed sale of the Sturgeon Falls plant of the Abitibi company to a Canadian syndicate headed by W. H. Gibbs, which was proposed to manufacture groundwood pulp.

While originally the bondholders' committee would have only sixty days to appeal on behalf of the Ripley plan for reorganization from the date of judgment, June 13 (cf. *The Paper Industry and Paper World*, p. 371, July, 1938) the courts are now on a vacation and the time for launching an appeal is automatically extended by another 30 days.

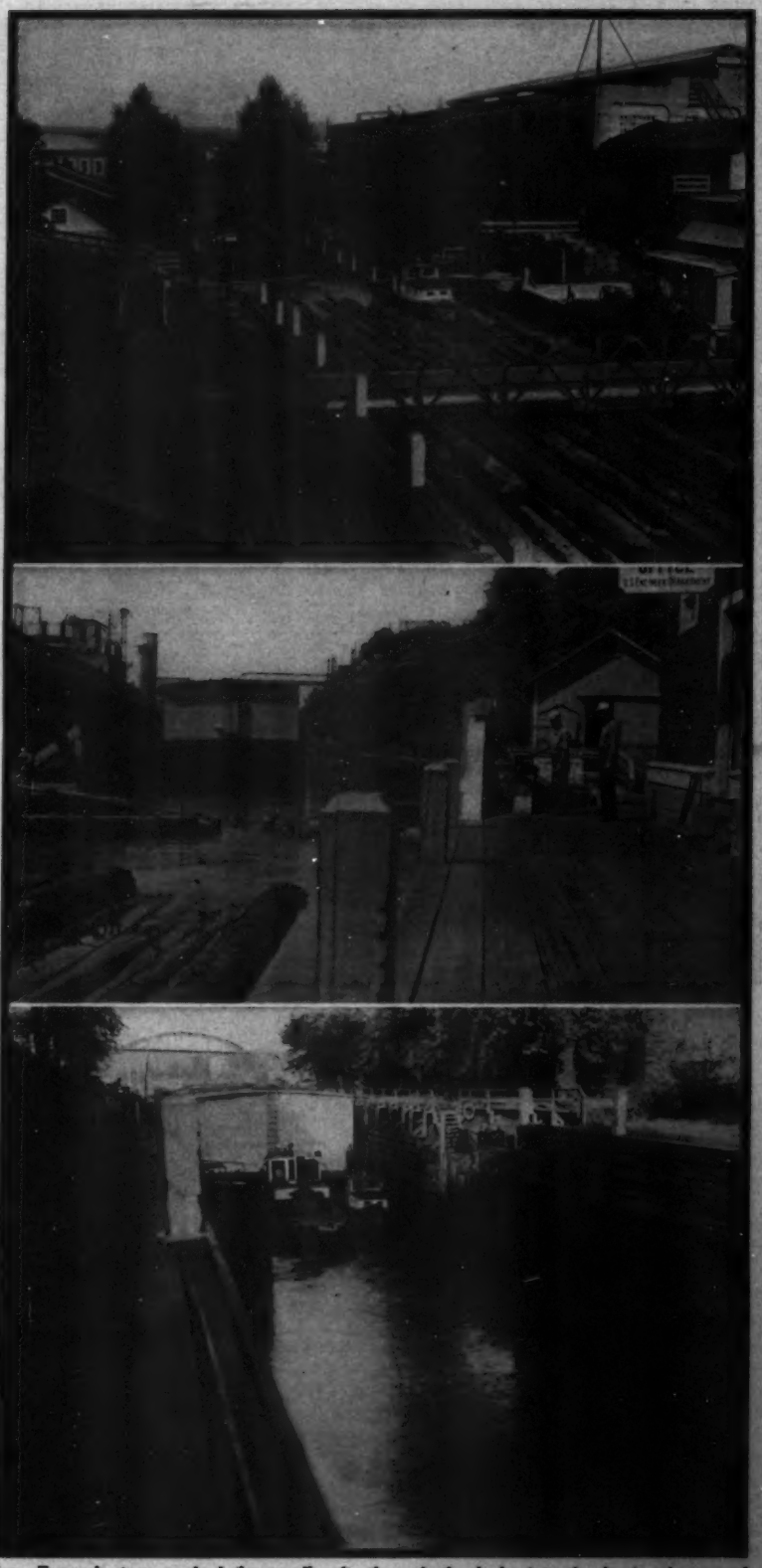
AIR HOISTS AID LOG MOVEMENTS

Movement of logs to the West Linn, Ore., plants of the Crown-Willamette Paper Company and the Hawley Pulp and Paper Company has been facilitated by a novel application of compressed air, figured out by the U. S. engineers and recently installed at the Willamette Falls Locks at that point. There are five of these locks in all, three being in the main lift, with one above and below, used or not according to the stage of water. The three main locks are adjacent to the plant of the Crown-Willamette Company, as shown in one of the illustrations.

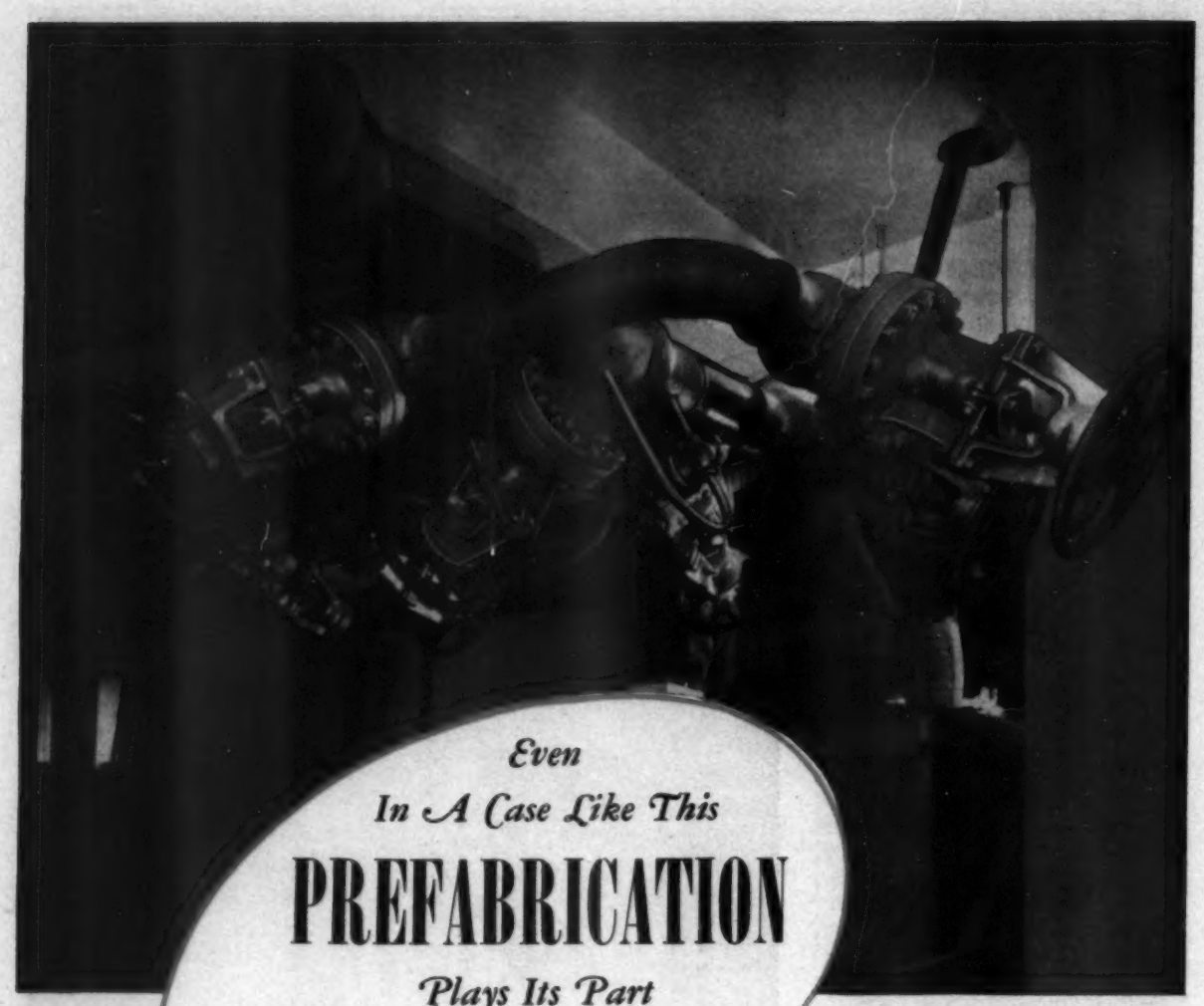
Formerly, the logs coming up had to be moved through the locks by two tugs, as shown in the picture, to reach the basin. Then if there was no down movement of boats or saw mill logs from above, the two tugs had to be passed back idle. What the engineers did was to install three ordinary compressed air hoists and use them as mules to draw the logs and also to open the gate on the side of the locks where they were installed. The towing is done by means of a quarter-inch steel cable on the drum of the hoist, which is attached to the dog lines of the small 50,000 foot rafts. The locks are old timers, built about 60 years ago. The total lift is 45 feet, width 40 feet, and length of each lock 210 feet.

The Hawley Pulp and Paper Company gets part of its hemlock logs from the Columbia River and from thence up the Willamette to Oregon City and West Linn, a few miles above Portland. It also gets some by rail. The Crown-Willamette timber also comes up from below. Last year, the locks put through 70,000,000 feet for the two plants. Crown-Willamette also ships on the average about 400 tons of paper a day down through the locks, according to the lock master. This goes in large covered barges, which are picked up below the locks by tugs and towed to Portland to be picked up by steamer.

The three hoists so far installed take such a comparatively small amount of air that no compressor plant has been installed, and the air is piped over a few hundred feet from the Crown-Willamette plant. The engineers and plant operators ceased figuring just how much air was required, and compromised on a small flat sum per year.



Top—Formerly tugs pushed the small rafts through the locks into the basin above and then went back through the locks idle. Center—Now the logs are drawn through the locks by compressed air hoists. The hoist at the right has dropped the tow line, reversed its operation and is opening the right hand gate. Bottom—Formerly tugs went back through locks idle but in this case they are pushing through one of the Crown-Willamette covered paper barges which is to take the finished product down to Portland.



Even

In A Case Like This

PREFABRICATION

Plays Its Part

The compactness that locates this group of big gate valves close together can be provided in only one way . . . by carefully engineered, prefabricated sub-assemblies, welded into a finished unit.

Back of this complicated piping installation lie engineers' ideas and plans, interpreted by Grinnell . . . . plant facilities that provided the sub-assemblies to accurate dimensions, in the proper material, on Grinnell's unfailing schedule . . . . welders whose work qualifies for insurance . . . . all reasons why engineers faced with routine or unusual piping jobs are saying, "Give the plans to Grinnell." Grinnell Co., Inc., Executive Offices, Providence, R. I. Branch offices in principal cities of the United States and Canada.

SEND FOR THE PICTURE-STORY

"Grinnell Prefabricated Piping" — scores of photographs of Grinnell prefabrication facilities and power and process installations.

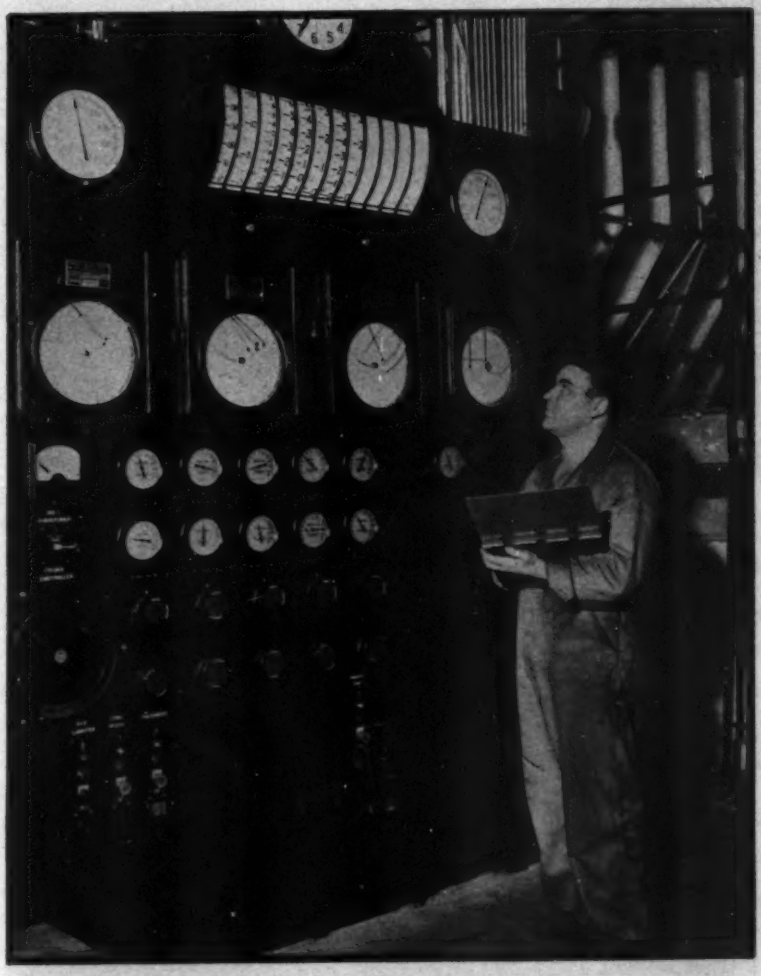
PREFABRICATION BY **GRINNELL**

WHENEVER PIPING IS INVOLVED

K-C COMPLETES INSTALLATION OF NEW BOILER

The Kimberly-Clark Corporation has completed installation of a 900-pound pressure boiler at its mill at Kimberly, Wisconsin. Only one man is required for its operation, as the entire system is almost entirely automatic, including feeding of pulverized coal and removal of ashes. Constructed almost entirely of brick, except for insulation the boiler is 62 feet long, 40 feet wide and 60 feet high.

The boiler has a heating surface of 14,400 square feet and generates 170,000 pounds of steam per hour. The equipment also embraces automatic safety features to eliminate chances of explosion.



Even the color of the smoke issuing from the chimney is recorded on this instrument panel, which is one of the features of the new boiler which has been installed at the Kimberly-Clark mill at Kimberly, Wisconsin. Myron Mislinski, the operator, is shown taking down readings from the numerous dials that reflect each movement and process in the mammoth unit.

MORE PAPER MILL FACILITIES AT FORD MOTOR CO.

The Rouge Plant of the Ford Motor Company will build additional paper mill facilities at a cost of $300,000, according to a recent announcement.

This expenditure covers a building addition 260 by 60 feet and new equipment which will increase the paper mill's capacity by about 40 per cent. The equipment is designed for the production of a new resin board developed by Ford for use as an upholstery backing in car body interiors.

Included in the new equipment is a giant paper board dryer, 156 feet long, which is capable of drying binder board much faster than any other machine of its type. A new 1825-ton hydraulic press is also being installed. This latter apparatus will heat the resin board to a temperature of 320 degrees and apply to it a pressure of 65 tons to the square foot.

IMPROVEMENTS AT PACIFIC MILLS, LTD.

During the past year Pacific Mills, Ltd., have spent a total of $200,000 on construction of a new warehouse, erection of a new dock and other improvements to their plant at Ocean Falls, B. C. The new warehouse is two stories high and the floors are designed to accommodate seven thousand tons of newsprint on the lower floor and 3,500 to 4,000 tons of counter rolls, stock jumbos, fibre-board and other specialties on the upper floor. The new dock is 300 feet long and 50 feet wide and is dredged to provide accommodation for vessels at extremely low tide.

◆

NEW TURBINE FOR MOORE & THOMPSON

A new steam turbine is being installed in the Moore & Thompson Paper Company of Bellows Falls, Vermont. It is expected to be in operation shortly. When working the turbine will produce 1,000 to 1,250 kilowatts. Exhaust steam is used in the production of electricity so that the cost for the electricity to run the mill will be exceedingly low. Special parts are being made by the Westinghouse Electric and Manufacturing Co.

◆

EVEREST PREDICTS BUSINESS UPTURN

The next few years will see a gradual improvement in business, in the opinion of D. C. Everest, vice-president and general manager of the Marathon Paper Mills Company. Mr. Everest expressed his views in an address July 21 at an outdoor mass-meeting at Menasha, Wisconsin, sponsored by manufacturers, business and professional men of Neenah and Menasha, in encouragement of a slogan coined by George Mason of Nash-Kelvinator, "Sales Mean Jobs."

Mr. Everest believed that the mental attitude is being changed and that gloom-dispensing is approaching its end. Government spending, widely distributed as it is, is a factor in improvement, he said, adding that commodity prices are at the lowest level in some time. A great potential demand, not only in the consumption goods market, but also in the heavy industries and capital goods, has waited for these lower prices, Mr. Everest stated.

Mr. Everest predicted an improvement in the automotive industries and foresaw a shortage of skilled labor, in view of the fact that young men have not become apprentices during the last ten years. Eventually all who desire work will be employed, he said.

FINANCIAL

WITH July paper production up to the highest point of the year, and an improvement in stock market quotations for paper securities, some back stories of the effects of the depression are still being told in earnings reports of the major paper manufacturing companies. Meanwhile, some jobbers report that sales of small lots at the job lot differentials have actually increased their net profits, though with a lower total turnover.

Official income statements include the following:

Allis-Chalmers Mfg. Co.—Report for the first six months of 1938 shows a net income of $2,879,059, or $1.62 on each of 1,776,092 shares of common stock. In the corresponding period of 1937 the company had a net of $4,141,747, or $2.34 per share of common.

Bartgis Brothers—Net profit for the six months ending June 30 totaled $38,844.70, equivalent to 31 cents per share, as compared with earnings of $70,183 for the same period in 1937. A dividend of 15 cents per common share payable April 30 was paid. Net sales decreased over $35,000 as compared with the previous year while payrolls increased $12,000.

Certain-teed Products — Quarter ended June 30 showed profit of $106,619, compared with $163,056 for the same quarter of 1937 and a loss of $189,588 for the March quarter. The first six months showed a loss of $82,969, as against a profit of $170,072 for the first half of 1937.

Champion Paper and Fibre Company—Net profit for the year ending April 24 was $1,557,439, or $1.98 per common share, as against $2.34 per share for the preceding year.

Container Corporation—Net loss for the six months ending June 30 was $120,251, compared with a profit of $1.69 for the preceding year.

Crown Zellerbach Corp.—Earnings for the year ending April 30 totaled $6,211,414, or $1.57 on the common stock, compared with $5,094,403 for the previous year. During the first half of the year the company's mills operated to capacity, but in the last half at less than normal capacity.

Crystal Tissue Company—Net loss of $29,632 is reported for the six months ending June 30, as against a profit of $61,288 for the same 1937 period.

Robert Gair Company—Report a net loss after providing for interest on income notes and income taxes of $35,688.17 for six months ended June 30.

Hinde and Dauch Paper Company—Earnings for the first half of 1938 were about $300, or 60 cents per common share, as compared with $1.97 for the same months of 1937.

Hummel-Ross Fibre Corp.—Profits for the six months ending June 30 were $49,418, equivalent to 7 cents per common share, as against $1.13 per share for the preceding year.

Keyes Fibre Company—Net income for the six months ending June 30 was $82,727, as against $59,910 for last year.

Kimberly-Clark Corp. — Earnings for the quarter ending June 30 were $275,214, or 56 cents per common share, compared with 89 cents for the first quarter of the year and 97 cents for the second quarter of 1937.

MacAndrews and Forbes — Net profit for the quarter ending June 30 was $185,629, or 51 cents per share, compared with 70 cents for the same quarter in 1937 and 42 cents for the first quarter of 1938.

Mead Corp.—Net income for the

New York Stock Exchange—Stocks

	1938 Closing Sale June 30	Closing Sale July 30
Celotex	21	23
Same Preferred	62	70
Certain-teed Products	8 1/8	9 1/2
Same Preferred	30 3/4	30
Champion P. & F. Co.	24 3/4	28
Same Preferred	95	97 3/4
Cont.-Diamond	8 1/2	10 1/2
Crown-Zellerbach	11 3/8	13
Dixie Vortex	15	13 3/8
Same "A"	31	32 1/4
Robert Gair	4	4 7/8
Same Preferred	14 1/4	16 1/8
Inter. P. & P.	8 3/4	10
Same Preferred	38 1/2	42 1/2
Kimberly-Clark	26 1/8	29 1/8
MacAndrews & Forbes	28 1/2	30 3/4
Masonite	42	48
Mead Corp.	13	14
Same Preferred	——	67
Paraffine Co.	44 1/2	48
Same Preferred	89	94
Rayonnier	13 3/4	14 3/8
Same Preferred	20 1/2	22 1/2
Scott Paper	44	45 3/4
Union Bag & Paper	12 7/8	13 3/4
United Paperboard	6	7 1/8
U. S. Gypsum	87 1/2	87 3/4
Same Preferred	——	169

New York Stock Exchange—Bonds

Celotex 4 1/2%	81	86
Certain-teed	71 1/4	76 1/2
Champion P. & F. Co. 4 3/4%	——	99
Container Corp. 6%	103 1/4	——
Same 5%	96	97
Inter. P. & P. 6%	81 1/2	89
Same 5%	90 1/2	97
Mead Corp.	——	104 1/4

New York Curb Exchange—Stocks

Am. Boxboard	3 3/4	11
Brown Co. Pfd.	26	29 1/4
Detroit Paper Prod.	——	3 3/4
Great Northern Paper	——	28 7/8
Hummel-Ross	——	4 3/8
National Container	7 1/2	7 7/8
St. Regis	3 1/4	3 3/4
Taggart	——	6
United Wall Paper	——	2 3/8

DON'T PAY TOLL TO FRICTION— MODERNIZE WITH TIMKEN BEARINGS

A symbol of quality for any piece of equipment with which it is associated

Friction takes a heavy toll in paper mills where power is unprotected against it. Abolishing this toll is the job TIMKEN Bearings are doing with marked success in paper making machines; fourdriniers, dryers, beaters, shredders, Jordan engines and super calenders.

The Pennsylvania's new Broadway Limited rolls on TIMKEN Bearings. GLIDE—as you ride a Timken Bearing Equipped train

In some cases TIMKEN Bearings have reduced power consumption in super calenders as much as 50% and at the same time increased production 33%. Calendering quality is higher too—for with the rolls on TIMKEN Bearings alignment is preserved and grease leakage is eliminated. Why continue to be handicapped by equipment that costs too much for power, lubricant and maintenance—equipment that is slow and undependable—when you can modernize it with TIMKEN Bearings at moderate cost? Consult the equipment builder or our engineers.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Manufacturers of TIMKEN Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; TIMKEN Alloy Steels and Carbon and Alloy Seamless Tubing; TIMKEN Rock Bits; and TIMKEN Fuel Injection Equipment.

TIMKEN
TAPERED ROLLER BEARINGS

three four-week periods ending June 11 was $63,519, as against $606,854 for the same period in 1937.

Mosinee Paper Mills Company—Net profit of $42,637 for the year ending May 31 was a drop of $250,000 from the earnings of the preceding year.

Munising Paper Company—A dividend of 25 cents per share on the preferred has been declared for the current quarter.

Oswego Falls Corp.—Net earnings before Federal income tax were $290,783 for the six months ending June 30, as compared with $370,034 for the same period last year.

Rayonier, Inc.—Profits for the year ending April 30 were $3,124,703, or $1.94 per common share. Inasmuch as the company was formed in November, 1937, the statement covers the earnings for the year prior to that time of three predecessor companies.

Soundview Pulp Company—Net earnings for the first six months of 1938 were $307,972 as against $670,979 for the same period of 1937.

Sutherland Paper Company—Net profit of $391,506 for the six months ending June 30 is equivalent to $1.36 per common share, as compared with $1.71 for the same period of 1937.

Tomahawk Kraft Paper Company—Net profits for the year ending May 31 were $29,854 as compared with $168,735 for the preceding year.

Whitaker Paper Company—Net profits for the first six months of 1938 totaled $60,335 or $1.06 per common share, as compared with $209,198 for the same period of 1937, or $5.98 per common share.

◆

AWP REPAYS LOAN

All of the $500,000 borrowed from the Federal Reserve Bank of Boston by the American Writing Paper Corporation of Holyoke, Mass., has been repaid. When the "Eagle A" was reorganized, a half-million dollars was borrowed on April 1, 1937. Thomas Harper Blodgett, chairman of the board of directors, announced the repayment in presenting his semi-annual report.

◆

PAPER FESTIVAL FOR SAVANNAH

In recognition of the establishment in the South of a new paper and pulp manufacturing business, plans have been launched for the holding of a paper festival at Savannah, Georgia, in the spring of 1939. Instituted by the industrial, civic and professional interests of Savannah, preliminary plans call for a south-wide observance in which states along the Atlantic and Gulf coasts, where paper mills are either already built or are under construction, will participate.

It is fitting that the movement should begin at Savannah and that the first festival will be held in that historic old Southern city for it is there that the late Dr. Charles H. Herty, discoverer of the process for making newsprint pulp from southern pine, maintained his laboratory.

◆

UNUSUAL VIEW OF CHIP BIN

Seldom in the construction of a digester building in which the chip bin is located above the digester installation is it common to extend the bin other than the full length of the building. The chip bin in the new mill of the Container Corporation of America at Fernandina, Florida, however, has a chip bin over its digesters that on one end is some feet from its corresponding digester building end wall. A view of this chip bin end, taken from the digester operating floor, not only reveals interesting features of structural design, but interesting perspective as well. (See Page 510). By holding the illustration horizontally at an angle of about 45 degrees above eye level, the bin can be seen in about normal perspective.

◆

EASTERN FIRMS WILL SUPPLY PAPER TO ARMY

The Chemical Paper Manufacturing Company of Holyoke, Mass., and the P. H. Glatfelter Company of Spring Grove, Pa., will supply paper under a $11,640 government contract awarded to the Barton, Duer & Koch Paper Company, Washington, D. C., by the U. S. Army. The paper will be used by the Quartermaster Corps of the Army. September 30 has been set as the completion date.

◆

POWER STATION FOR MENASHA

Appraisers appointed by the court to determine the value of land being sought by the city of Menasha, Wisconsin, from the Menasha Wooden Ware Company as a site for a power substation serving the paper mill area of Menasha, have set a purchase price of $7,033. The city will use the substation in the purchase of power from the Wisconsin Michigan Power Company instead of building a new steam plant, as was previously proposed. The Wooden Ware Company had asked $10,000 for the land.

BRIEFS

▶▶▶ THE FREIGHTER, CANADIAN CHALLENGER, was recently overhauled in the Vickers drydock at Montreal where she was fitted for carrying newsprint. She left Montreal towards the end of July to load a full cargo of paper at Three Rivers, Quebec, and Port Alfred on the Saguenay. Her destination is Australia.

◆

▶▶▶ BADGER PAPER MILLS, INC., Peshtigo, Wisconsin, has replaced the roof on its machine room with a new one of fireproof texture, the work being done by John Salen & Son, Menominee, Michigan. The roof is 200 by 80 feet.

◆

▶▶▶ AT A SPECIAL MEETING of the Board of Directors of the American Boxboard Company held July 22, the regular quarterly dividend of 1¾ per cent was declared on the 7 per cent cumulative preferred stock of the company.

◆

▶▶▶ THE TUG, ABITIBI, second vessel to be built by Canadian Vickers for the Abitibi Power and Paper Company, was launched at Masionneuve, Montreal, on July 7.

◆

▶▶▶ PATTEN FINE PAPERS INC., Appleton, Wisconsin, has filed an amendment to articles of incorporation with the Secretary of State at Madison. The amendment provides for buying, selling, dealing, leasing and holding of real estate.

◆

▶▶▶ PAPER PRODUCTION IN WISCONSIN last year totalled 950,000 tons valued at $87,000,000, an increase of twenty per cent over 1936, according to a report by the Milwaukee section of the American Chemical Society.

◆

▶▶▶ AN ORDER SANCTIONING proposed arrangements between Great Lakes Paper Company, Ltd., in liquidation, and its creditors, has been granted by Justice Greene. The purpose of the order is to distribute the stock in the new company, the Great Lakes Paper Co., Ltd., allotted to the liquidator at the time of the sale three years ago.

DOWN WENT THE MERCURY—35°!

Shell showed this paper company how to keep its speed reducer cool*

A LARGE Wisconsin paper and pulp company was having trouble with the speed reducer driving their paper-drying machine.

Failure of the lubricant used on the enclosed hypoid gears was causing the reducer to run at extremely high temperatures. Excessive carbon formation was clogging oil holes and grooves, and it was necessary to change the lubricant every six days.

Realizing that breakdown of the speed reducer meant shutdown of the entire paper machine and auxiliary equipment, this company called on Shell to help solve their problem.

Working with the company's maintenance men, the Shell engineers made a thorough examination of the speed reducer. They then recommended the proper type and grade of Shell Lubricant for this particular job.

The results were immediate. With the Shell Lubricant, the former operating temperature was reduced by 35° F.! There was no carbon formation, and, after eighteen days' operation, all oil holes and oil grooves were found to be free and clean!

Some of the toughest problems of industrial lubrication have been solved by Shell engineers in paper plants. They bring to your problem skill developed from experience in solving others' problems. Their tools are the finest lubricants being refined today. This "plus" in lubrication is always ready to help you. Simply write or call your nearest Shell office.

*Case History No. 1023 from Shell's files.

SHELL

SHELL PAPER MILL LUBRICANTS

YOU'RE WANTED!

At GREEN BAY, WIS. for the

Tappi Convention

SEPTEMBER 8-9-10

FOR HOSPITALITY

. . Green Bay offers you a record of 304 years of entertaining visitors in a most thorough and friendly manner. Fishing, yachting, golf, woodland scenery and historical points of interest are but a few of the many attractions this year's Convention City holds in store for you.

FOR PAPER MAKING

. . Green Bay offers you three large self-contained mills, plus four converting plants, which combined, make Green Bay the world's largest manufacturing center of personal-use papers. Also, in the vicinity of Green Bay, there is more than a score of other pulp and paper mills producing a wide range of paper products.

★ ★ ★ ★ A Four Star Program ★ ★ ★ ★

FOR BUSINESS

Visits to woods and mills . . visits to Institute of Paper Chemistry . . visits to Forest Products Laboratory . . discussions on paper and pulp problems . . a diversified program of technical papers by well-known authorities.

FOR PLEASURE

Luncheons . . entertaining speakers . . golf, skeet, bridge, horseback riding, yachting . . prizes galore . . Harvest Festival Costume Ball . . trip to Maxwelton Braes . . professional football game, Green Bay Packers vs. Cleveland.

FOR INFORMATION AND RESERVATIONS

Write A. B. Hansen, - General Chairman

P. O. BOX 645 — GREEN BAY, WISCONSIN

"HISTORIC GREEN BAY WELCOMES TAPPI"

SAVES $3,700 PER YEAR

Large Paper Mill Replaces Out-Dated Pumps With Modern Allis-Chalmers Pumps! New Pumps Pay For Themselves! Get the Whole Story on the Savings Allis-Chalmers Pumps Can Offer You!

SHOWN ABOVE IS THE 8" x 5" type SSOR paper stock pump with 30 hp splash-proof motor. Rating: 1000 gpm, 65 ft head, 1750 rpm. **HANDLING BROWN STOCK** are the two 12" x 10" type SSOR stock pumps at the left.

When profit margins narrow . . . when materials increase in price . . . you've got to cut your operating costs! You've got to replace out-dated equipment . . . old pumps that may still give service but that cost too much to run . . . with new, improved equipment . . . with Allis-Chalmers Pumps!

A large paper mill, with Allis-Chalmers engineering assistance, has just replaced seven old, out-dated pumps with six new pumps of the latest design. The old pumps took 320 bhp to do their work . . . but the new pumps use only 159 bhp—a saving of 161 bhp!

Each horsepower saved represents $23. The actual money saved per year by this replacement will amount to $3700! Yet the complete installation of the new pumps cost only $4800—the pumps will pay for themselves in less than a year and a half! And they'll go right on making that saving . . . $3700 a year . . . for years to come!

Find Out How You Can Save!

That's another case history from Allis-Chalmers' files. Another example of the way Allis-Chalmers Centrifugal Pumps slash operating costs . . . cut overhead . . . make possible a wider profit margin!

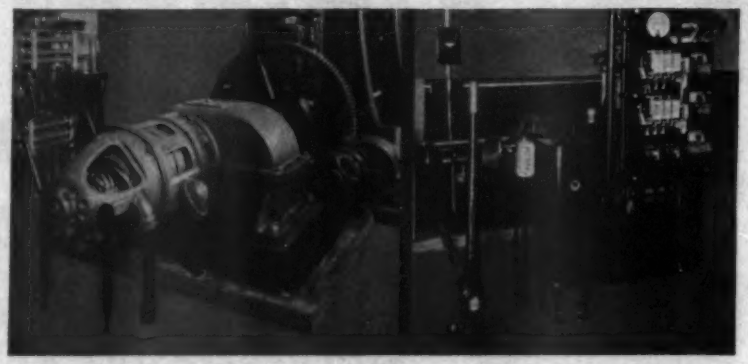
Get the whole story. Find out why Allis-Chalmers pumps *can* cut your pumping costs. Learn the advantages of undivided responsibility—of one contract for both pump and drive. Learn what Allis-Chalmers engineering . . . testing and research facilities . . . can mean to you in getting the right pump for the job you want done.

Get the facts. There's an Allis-Chalmers representative near you. There's an Allis-Chalmers man . . . a trained pump engineer . . . ready to show you how to cut your pumping costs . . . to slash dollars from your overhead. He's the man to see! Get in touch with him!

ALLIS-CHALMERS
MILWAUKEE WISCONSIN

SINGLE STAGE DOUBLE SUCTION PUMPS • CLOSE COUPLED SINGLE STAGE SSUmi PUMPS • MULTI STAGE PUMPS • PAPER STOCK PUMPS • MIXED FLOW AND AXIAL FLOW PUMPS • AND SPECIAL DESIGNS FOR UNUSUAL APPLICATIONS

HAVE YOU SEEN THIS NEW CALENDER DRIVE?



Left: New power-saving calender drive. May be attached to your present calenders. Right: Control panel for new calender drive.

This New Norwood Calender Drive will give you more efficient operation and cut down on power costs. It is of the enclosed gear type; it gives a gradual, even, smooth acceleration; it is unusually quiet. May be attached to your present calenders.

All Rolls Are Easily Removable on the New Norwood Calenders, without disturbing the set of other rolls. A new type sill makes it possible to remove the bottom roll without disturbing others.

Norwood has been working with paper mill men for nearly half a century. You can depend on Norwood Water Filters and Norwood Paper Finishing Machinery.

Send for catalogs, or write us about your filtration or finishing problems.

THE NORWOOD ENGINEERING CO.
16 No. Maple St., Florence, Mass.

A GOOD START AND A GOOD FINISH WITH
NORWOOD
DEPENDABLE WATER FILTERS AND PAPER FINISHING MACHINERY

Appleton
FELTS
MAKE GOOD PAPER

APPLETON WOOLEN MILLS, APPLETON, WIS.

Attend TAPPI Convention, Green Bay, Wisconsin, September 8, 9 and 10.

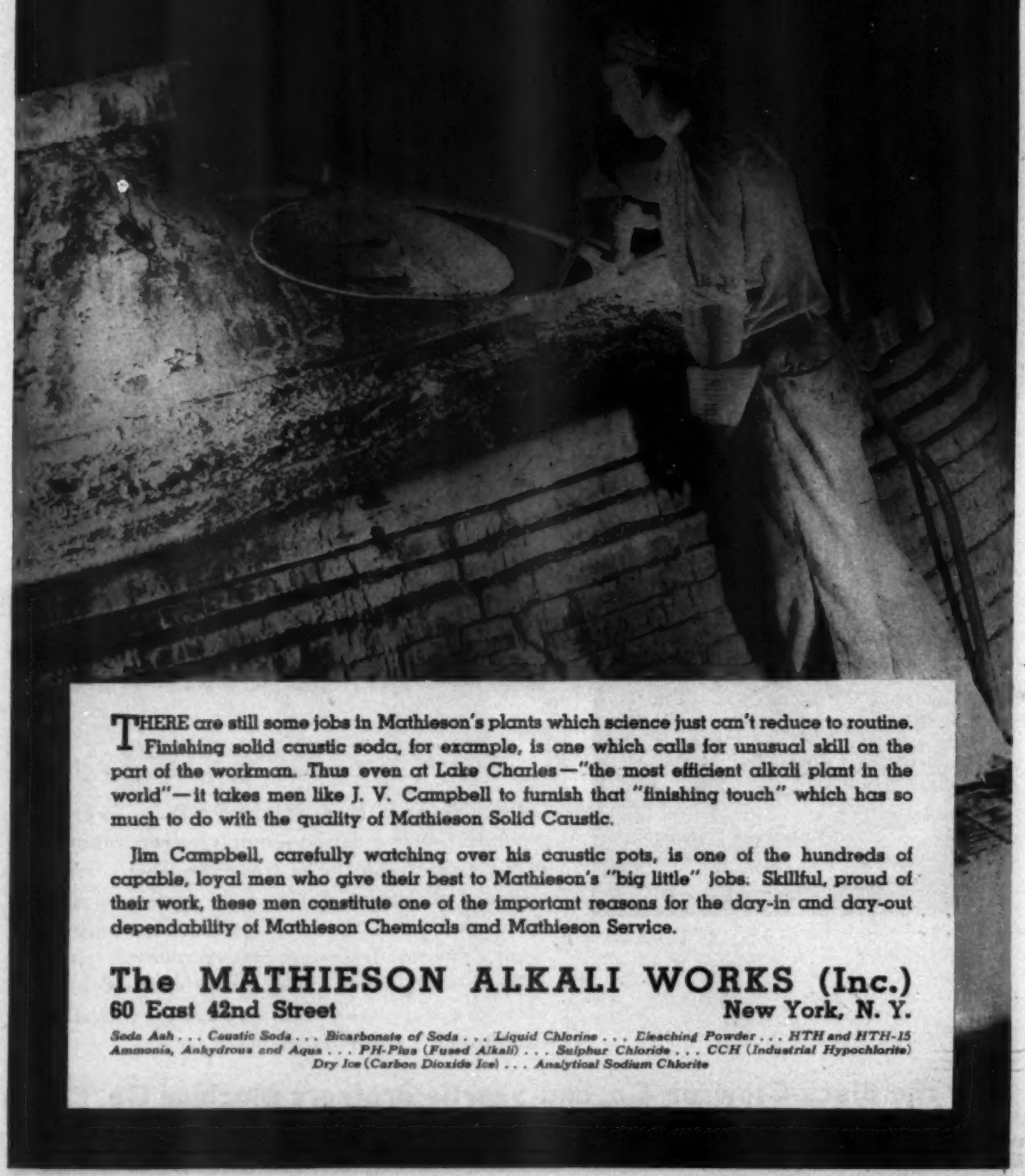
TUGBOAT ANNIE
Unmatched for pulping, bleaching, and deinking. Only 4 years old . . . yet 72 in service.

BLACK CLAWSON
and
SHARTLE BROS.

LIKE RINGS ON A MILLPOND . . . Ever-spreading, ever-widening—that is the reputation of Tugboat Annie. In increasing numbers, mill men are acclaiming Annie as the fastest, most thorough of all pulpers. • Tugboat Annie keeps good company. The many other paper mill machines built by Black-Clawson and Shartle Bros. also are sales leaders because of their outstanding performances.

The Black-Clawson Co. and Shartle Brothers Machine Co.

THE FINISHING TOUCH



THERE are still some jobs in Mathieson's plants which science just can't reduce to routine. Finishing solid caustic soda, for example, is one which calls for unusual skill on the part of the workman. Thus even at Lake Charles—"the most efficient alkali plant in the world"—it takes men like J. V. Campbell to furnish that "finishing touch" which has so much to do with the quality of Mathieson Solid Caustic.

Jim Campbell, carefully watching over his caustic pots, is one of the hundreds of capable, loyal men who give their best to Mathieson's "big little" jobs. Skillful, proud of their work, these men constitute one of the important reasons for the day-in and day-out dependability of Mathieson Chemicals and Mathieson Service.

The MATHIESON ALKALI WORKS (Inc.)

60 East 42nd Street **New York, N. Y.**

Soda Ash . . . Caustic Soda . . . Bicarbonate of Soda . . . Liquid Chlorine . . . Bleaching Powder . . . HTH and HTH-15 Ammonia, Anhydrous and Aqua . . . PH-Plus (Fused Alkali) . . . Sulphur Chloride . . . CCH (Industrial Hypochlorite) Dry Ice (Carbon Dioxide Ice) . . . Analytical Sodium Chlorite

Editorial ★ ★ ★

GENERAL BUSINESS GROWS CAUTIOUSLY BETTER

▸▸▸ JULY BUSINESS was better than June and all indices point to the fact that August general business will show a larger per centum gain over July than July did over June.

The June rise in the stock market foreshadowed the turn of general business. The decline, which set in last autumn, ran its course and an upturn was inevitable. As always, the stock market advance preceded the upturn in general business. However, it has been a powerful factor in dramatizing to the country the upward trend in business was here.

Last fall, when the decline of the stock market set in, it caught general business with heavy inventories which had to be liquidated. The liquidation had all been accomplished by the end of the first quarter of this year, but it left the liquidators in a pessimistic mood regarding re-stocking to such a degree that by May and early June, consumption of goods in general in the country had for the first time in our memory exceeded production. This situation just could not obtain for any length of time—hence, the improvement in general business volume in June, over May, and a still further increase in volume in July.

As for the immediate future, the increase in business volume is certain—not with any burst of buying on a large scale, but rather a continuous, conservative, sure expansion in preparation for a fall business of some considerable proportions. Consumer goods are already feeling the impulse. What with billions of dollars being pumped into the excess reserves of the banks by the United States Treasury and with other equally large spendings being made by the governmental aid departments, all this money spending is quickening the pulse of industry all along the line.

Durable goods are next in line. They will feel the effects later on, the full effects of which will not be apparent until late in the fall and will continue into the winter.

However, the reluctance of business to re-spend to prospects is a most noticeable phenomenon. The disposition, as we see it, is to have the actual business in hand before orders are given for the goods. Buying on prospects, no matter how brightly they are painted, nor vociferously ballyhooed, is of no effect. Business confidence is still at a low ebb. The curve of low general business volume is merely the reflection of low business confidence of all business in the experiments of the political administration of business affairs. This is as inescapable a fact as the results of the Texas election are. Business is tired of political dictation and unless we miss our guess, the beginning of the end of irresponsible political domination of business and industry in this country is in the immediate offing.

As this phase of the trend of affairs becomes more and more apparent, business volume will increase. The elections this fall will tell the tale.

PUBLIC RELATIONS

▸▸▸ THE SUCCESSFUL MANAGEMENT of American business enterprise, in the opinion of F. K. Weyerhaeuser, President, Weyerhaeuser Sales Company, is the largest single factor that will bring back and maintain American prosperity. In expressing this opinion, Mr. Weyerhaeuser also makes it clear that management is the agency which must preserve the American record of accomplishment through individual initiative and resourcefulness; that the problems of management are becoming rapidly more complex with the passage of the years; and that today a knowledge of facts, an understanding of world economic trends, and a breadth of vision are required for its guidance to a degree undreamed of ten or twenty years ago.

Management, to put it another way, must become more public relations conscious.

No longer, for example, in the case of industrial plants, do industrial relations activities alone fill the bill. These activities still are important and must be reckoned with; but they are only a part of a much broader program as included within the scope of public relations activities.

Appreciative of this very situation, a quarterly magazine, *Public Relations*, the first issue of which made its appearance during the first quarter of 1938, has been conceived to integrate the processes and correlate the results of public relations, advertising and publicity techniques. Through its publication, an effort is being made to develop practical, basic approaches to the human problems of the machine economy; to reduce economic relationships to workable, man-to-man terminology. Regular departments as now provided for include: Industrial Relations, Group Relations, Associations and the Public Relations Forum.

Its publishers have dedicated the magazine to the challenge which the machine age has flung down to our people—the challenge to create an economy balanced by group cooperation and human understanding. Most certainly, such an ambition is a worthy one; and it represents a task which in fulfillment should never have a dull moment.

Our commendation goes to the publication with such a purpose. May it succeed beyond the hopes of its originators and through it develop a better understanding between individuals that make up industry, business and the general public.

Possibly you, too, are interested in such a publication but didn't know of its existence until now. Should such be the case, the address of the magazine is *Public Relations*, International Building, Rockefeller Center, New York, N. Y.

CURRENT THOUGHT

LET'S NOT BREAK THE BREAK

WILLIAM SIBLEY

BUSINESS in general right now is getting a break. Even at the risk of being assigned the adjective "lugubrious" let me advance a note of warning about going too fast. Let's not get excited over the jittery ascensions of the Big Board thermometer. Let's keep our sanity about the impending Wages and Hours Bill, and not try to beat the gun as we did in 1933 just prior to the encroachment of the NRA. Let's follow the guidance of experience rather than theory. Textbooks, compiled by theorists, tell us that confidence, prices, wages, and general business activity all advance simultaneously, but old Mother Experience proves they do not. With an upturn in business, such as we are enjoying this summer, labor unions and wage demanders swing their pendulum too far. Manufacturers are inclined to raise their prices too fast. A buying panic can set in as rapidly as a selling panic, and the result of such is another depressing slump. *This* summer and autumn, let's not go too fast. Let's not break the break.

Too many of us are inclined to give excessive credit to government spending, and be very skeptical about the duration of such stimulated prosperity. As a matter of fact, while government monies doubtless have some effect on the present upturn, they are by no means responsible for the improved feeling of business men everywhere. For one group to say "we planned it that way" and another group to insist that no one planned anything, that our economic disease has just burnt itself out is needless, futile and dangerous exercise, because such arguments are liable to muddy the industrial waters at just the time they are beginning to clear.

Too many of us have exaggerated fears over the forthcoming Wages and Hours Bill, and such fears incline us to the belief that it would be expedient to build up large inventories before the advent of that cost booster. As a matter of fact, this business of wage-minimums and hour-maximums is going to advance slowly, and probably for several years will affect so few that any inclination to build up inventories would soon be shown to be unsound thinking.

In every depression which followed the heels of mismanaged prosperity, there are always those who cry "The government could do it better." We shall hear much of that insistence during the next few political months. It is a doctrine that sounds good to the man on the street who, also, is full of mistaken judgment. Too many of us maintain our fears of that doctrine without doing anything to correct its vicious effect. Experience has repeatedly proved that the government cannot "do it better," nor even one-half so well. From the original Theodore Roosevelt who had a "bully" time swinging his "big stick" (albeit, very few others had the same sort of time) through the McAdoo regime of railroad control to the Wallace campaign of little-pig-killing-government, as powerful as it is, has definitely proved itself incapable of handling, or even controlling, industrial enterprise. Yet so many of us who know that sit back and fail to interrupt the man who erroneously claims that government can "do it better,"—and by virtue of our own lethargy do much to help break the break.

In the current issue of *Nation's Business,* Editor Merle Thorpe issues "A Prayer for Common Sense"—and closes his prayer with this fervent paragraph:—worthy of the cogitation of every voter:

"For nine years we have prayed for recovery. Let us now add a prayer for the recovery of our famed American horse-sense. It will show us the folly of expecting prosperity by magic. It may arouse an old-time indignation and anger against the wicked extravagance of the Washington rain-makers. Then, if in this mood, we issue orders to our congressional 'servants'—and back them up—we shall start on the slow and hard road toward regaining that national well-being which was once the envy of the rest of the world."

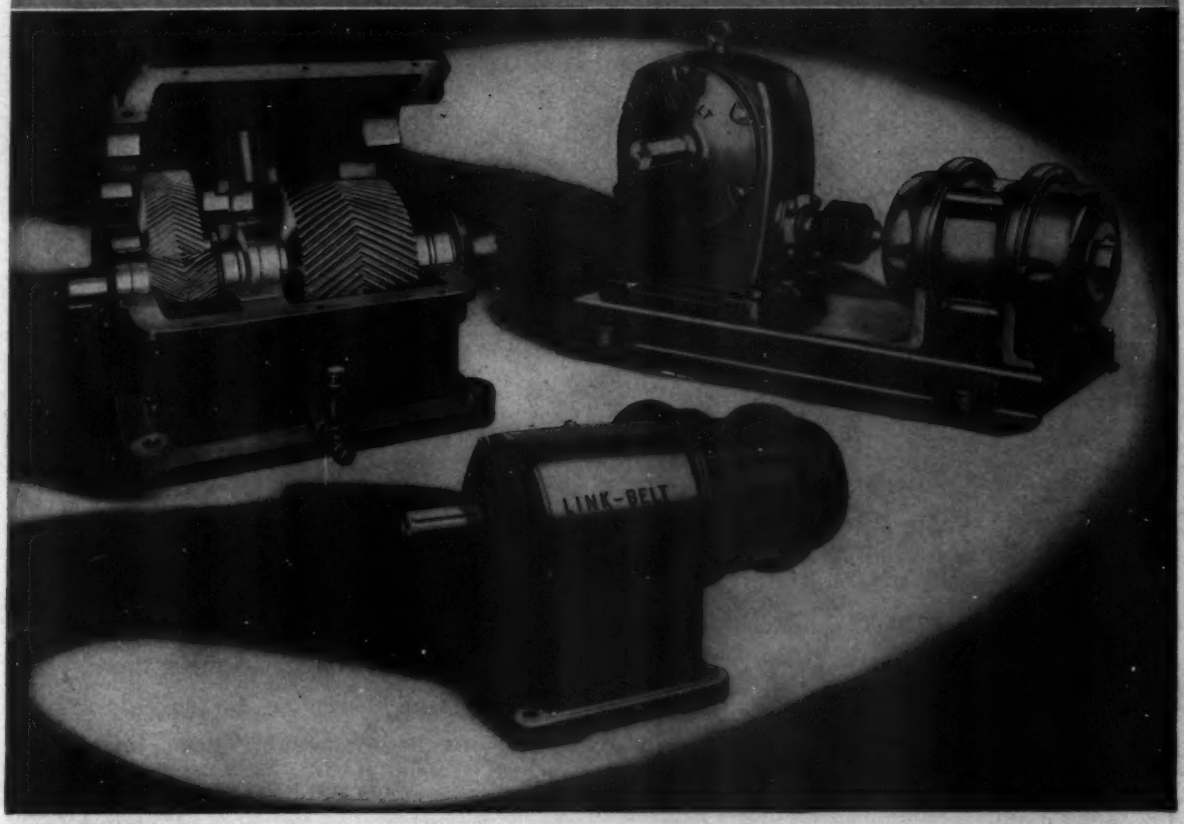
To this trenchant language I would like to repeat my personal belief that when, as now, business prosperity seems to be advancing on the solid foundations of confidence, there is little horse-sense in going too fast in any direction, even that of confidence. Prices can be raised too fast. The entire apple cart can be upset in the slimy gutter by the unreasonable demands of labor. Buying can become panicy as easily as selling. It is so easy to mistake the St. Vitus dance of economic fears for constructive activity—until realization of frustration and fatigue have been forced on us. Right now—this autumn—let's exercise plain, unadulterated, horse-sense and not break the break.

▶▶▶ ACCORDING TO ONE EXECUTIVE of a large industrial concern: "A new machine invariably runs smoothly and quietly. That is because it is unworn. When old, and the several parts need replacement, it is inclined to clatter and sound harsh. This is not 'noise.' It is wear expressing itself." . . . This analysis might well be extended to Washington and politics, for right now we have a number of senators and congressmen who are creating a great deal of noise. Following the engineer's reasoning, this may be an indication of their condition of wear and need for replacement.

LINK-BELT

Speed Reducer Service

is UNBIASED *and* COMPLETE



● The three improved types of reducer units included in the Link-Belt line — Herringbone Gear, Worm Gear, and Motorized Helical Gear — meet today's needs for the dependable transmission of power at accurate speeds.

They are built in a large variety of sizes, ratios and horsepowers. Call in a Link-Belt positive drive specialist to help you select the most efficient unit for your requirements. Send for catalogs on these and other Link-Belt positive drives.

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The Leading Manufacturer of Positive Power Transmitting Equipment

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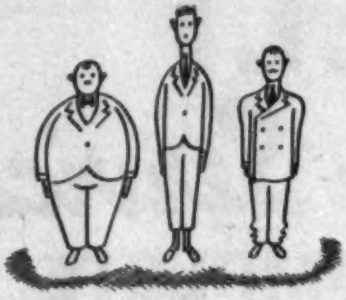

No "Ready-Mades" in Our Felt Business...

Every HUYCK Felt is Custom-Tailored for You

FIRST, *your* needs are determined. Next, Huyck experts draw up specifications to meet them. Then, from fleece to final inspection, an individual felt is built — to meet specific conditions on a particular machine. That is why Huyck felts — in size, in strength, in porosity, in finish, in all-round performance — have been for nearly 70 years so supremely satisfactory to the paper industry.

KENWOOD WOOL PRODUCTS

F. C. HUYCK & SONS

KENWOOD FELTS • ALBANY, N. Y.

"The Harvesters" by Pieter Bruegel the Elder

"The Harvest Does Not Come of Itself"

THE PUSEY AND JONES CORPORATION, WILMINGTON, DELAWARE

Can a Dryer Felt Last Too Long?

"When it comes to this question of the life of a dryer felt," a paper mill superintendent said recently, "it's an easy matter to fool yourself. After all, there's no point in keeping a dryer felt on the job after it has picked up so much dirt and grease that it hurts your finish and boosts your steam consumption. What you save in that way on your *felt*, you lose several times over in added steam cost and in the quality of your paper."

Particularly when you are considering *asbestos* felts it is important to remember that a dryer felt *can* last too long; because an asbestos felt costs so much more than a cotton felt that it *has* to be kept on the job longer to offer any advantage.

Mills that watch quality closely realize that it is a costly practice to give a dryer felt credit for extra life and ignore an offsetting increase in steam consumption and a sacrifice in paper quality. They consider *all* the factors that make up their drying costs, and, as a result, invariably prefer Cotton Dryer Felts—and usually HOOPERWOOD Cotton Dryer Felts. Because the normal, efficient life of a HOOPERWOOD Cotton Felt generally results in a lower *dryer felt* cost per ton of production and almost always in a lower *total* drying cost.

Samples and prices will be sent promptly on request.

WM. E. HOOPER & SONS COMPANY

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HOOPERWOOD ASBESTOS AND COTTON DRYER FELTS

EVERYONE is interested in pictures—editors and advertisers are using illustrations more and more. This trend is a challenge to the paper industry.

Of course, modern printing technique makes the best of the cheaper grades of paper, but any illustration is improved if printed on paper made with opaque white pigments. This modern paper mill practice prevents "show-through" and provides a brilliant white background against which no detail is lost. The type, too, is easier to read.

You can depend on Krebs white pigments to make any paper whiter, brighter, and more opaque.

KREBS

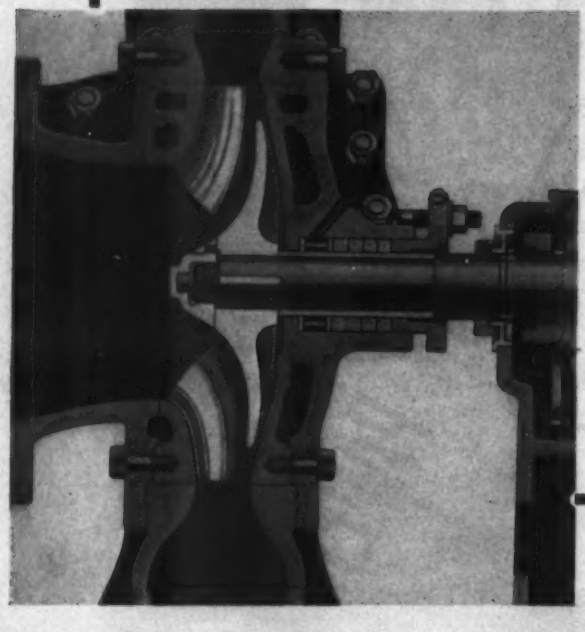
PIGMENTS FOR PAPER

KREBS PIGMENT AND COLOR CORP.

1007 ORANGE STREET, WILMINGTON, DELAWARE

CONSIDER THESE SIX SAFEGUARDS

against Stock Handling Troubles



- *Special vanes* on the back of Warren impellers prevent stock from jamming and binding the pump.
- *Extra heavy shafts* prevent vibration and deflection—save on maintenance.
- *Oversize bearings* assure low bearing pressures—minimize wear.
- *Large inlets,* pioneered by Warren, insure high density stock reaching the impeller.
- *Many sizes of suction nozzles* permit regulation of inlet velocity to meet the requirements of the job.
- *Diagonally split casing* permits quick removal of rotating element without disturbing piping.

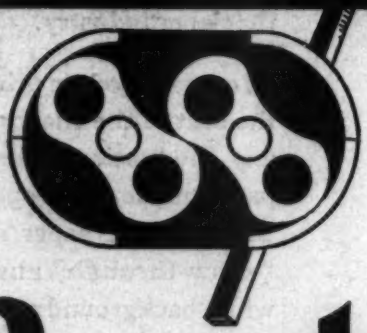
In the interest of savings in your mill, consult Warren on your requirements.

WARREN PUMPS

WARREN STEAM PUMP CO., INC., WARREN, MASSACHUSETTS, U. S. A.

Vacuum Pumps that cut your POWER COSTS

Net profits go up when power costs per ton of paper go down. The high efficiency of Roots-Connersville Vacuum Pumps are reducing the power costs in many mills. These savings in power consumption will, in many cases, equal the complete vacuum pump installation cost in a very few years of operation. Of even more importance is the proven dependability and the low maintenance of Roots-Connersville pumps which assure steady operation for your paper machines day in and day out.



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CONNERSVILLE, INDIANA

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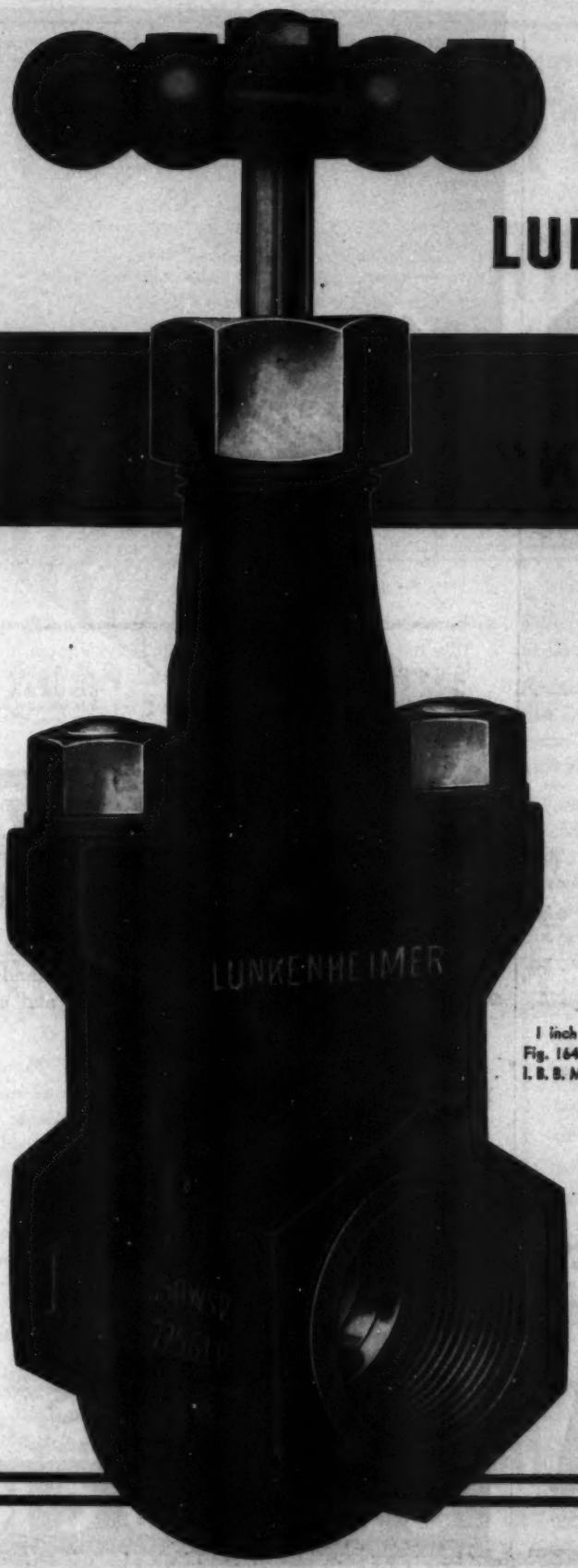

1 inch
Fig. 1640
I. B. B. M.

A sturdy general purpose gate valve with many distinctive features, original with Lunkenheimer, which mean extra valve service.

Available in
Bronze Mounted and All-Iron;
Inside and Outside Screw
or Quick Operating

Stocked by
Lunkenheimer
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ESTABLISHED 1862
THE LUNKENHEIMER CO.
"QUALITY"
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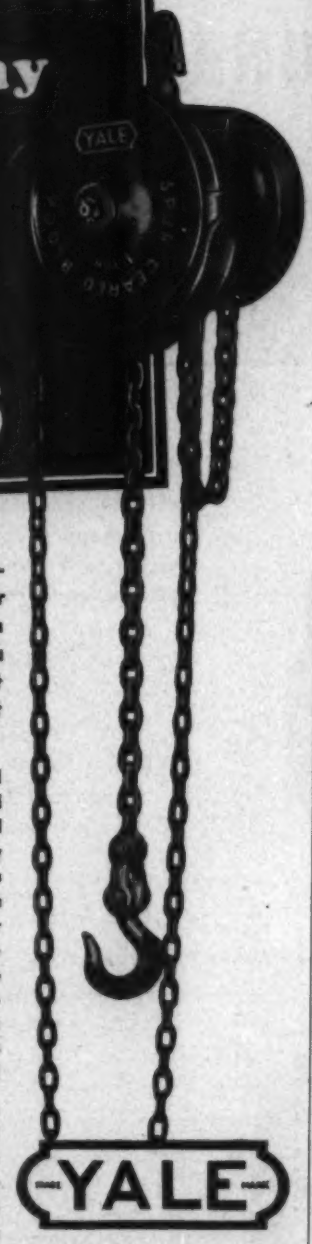
Safety + Efficiency + Economy = YALE CHAIN HOISTS



Take greater safety — greater economy — greater efficiency. Put them into a chain hoist, and what do you have? Answer — the best chain hoist on the market . . . YALE!

The first choice of industry 'round the world, the Yale spur geared hoist offers a higher mechanical efficiency return than that of any other hoist—85%! That means faster, more economical operation on *any* job. And for greater safety there is another feature that is EXCLUSIVE with Yale—the Steel Safety Hook. Under extreme overload this hook ***opens slowly without fracture.*** It's a safety gauge that never fails!

But these are just two of the many features that can be found on Yale Hoists. For complete details get our catalog from your local Yale distributor. It contains full information on the entire Yale line.

Capacities—300 lbs. to 40 tons

THE YALE & TOWNE MFG. CO.

Philadelphia Div.

PHILADELPHIA, PA., U. S. A.

In Canada, St. Catherines, Ont.

Send for this catalog today.

GARLOCK 777 SPIRAL PACKING
LA GARNITURE GARLOCK 777 EN SPIRALE
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LA EMPAQUETADURA GARLOCK 777 EN ESPIRAL
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In Any Language . . .

GARLOCK 777 is furnished in all sizes from ⅛" to 1⅜".

Garlock 777 LOW PRESSURE PACKING

THROUGHOUT the world GARLOCK 777 Low Pressure Spiral Packing is the accepted standard rubber and duck packing for use on hot and cold water rods and against low pressure steam.

The French, Portuguese, Spanish, Swedish, Finnish, Chinese, Japanese engineers and engineers of many other nationalities have been using GARLOCK 777 for years. It is illustrated and described in Garlock catalogs printed in many languages and distributed throughout the world.

To have this world-wide acceptance—to be known in practically every language—GARLOCK 777 must be a superior packing. Try it in your plant!

THE GARLOCK PACKING CO.
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GARLOCK

"If I were an ADVERTISING MANAGER"

That's just one of the talks to be delivered anonymously by a masked speaker that will set every man thinking at the Annual Conference of National Industrial Advertisers Association in Cleveland, September 21-23. A second masked speaker will tell what he would do if he were a publication representative.

We're not going to tell you much here—just highlight the program enough to make your mouth water and your brain tingle.

T. M. Girdler, Chairman, Republic Steel Corporation, is scheduled for the opening address and when "T. M." talks he says something.

J. H. McGraw, Jr. will talk on "What I Would Do *Now* If I Were An Industrial Advertising Manager."

The new Publisher's Statement will receive full discussion.

Clinic sessions, so popular last year, will again cover a wide range of interesting subjects. Two half-day sessions instead of one.

A general conference session will cover such subjects as "Preparing the Plan", "How to Gather Usable Material", "Copy Technique", "How to Sell Management", "Co-ordinating Sales and Advertising" and "How and Why to Use an Industrial Agency."

Another session will deal with "Problems of the Small Advertiser", "Production Problems", "Public Relations"—and there are many others.

If I were an Advertising Manager, I certainly would start now to make plans to attend the 16th N. I. A. A. Conference even if I had to hitch-hike to Cleveland. And I would send in my advance registration now to—Ed. Bossart, Bailey Meter Company, Ivanhoe Road, Cleveland, Ohio.

IF I EMPLOYED AN ADVERTISING MANAGER—I would make certain that he attended this Conference, because changing times and markets demand a changed viewpoint—a new viewpoint that can be obtained only by hearing discussions by men whose experience is up-to-the-minute—right up to September 21st.

NATIONAL INDUSTRIAL ADVERTISERS ASSOCIATION

100 EAST OHIO STREET • CHICAGO, ILLINOIS

"Buffalo" PUMPS An Important Cog In Better Paper and Pulp Manufacture!

WE have been making Buffalo Paper Stock Pumps for many years. We know the kind of pumps you *must have* in order to keep your production on schedule.

—Your pumps must not clog.

—They must not overload.

—They must be able to deliver high consistency stocks against high heads and at full capacities.

—They must operate at lowest power costs.

Buffalo Paper Stock Pumps have demonstrated again and again that they do all these things exceptionally well. That's why we say, "Buffalo Paper Stock Pumps have become an important cog in better paper and pulp manufacture."

For details write for Bulletin 953-D.

BUFFALO PUMPS, INC.

213 Mortimer St., Buffalo, N. Y.

Branch Engineering Offices in Principal Cities

In Canada: Canada Pumps, Ltd., Kitchener, Ont.

"Buffalo" PUMPS

used where Performance Counts

"EXACTING ENGINEERS PREFER POWELL STEEL VALVES"

1500 POUND
WELDING END
GLOBE VALVE
SPUR GEAR OPERATED

1500 POUND
WELDING END
GATE VALVE
WITH BY-PASS
AND MOTOR OPERATED

Powell steel valves have made a definite mark in the engineering world for greater efficiency in low and high pressure control equipment. Write for detailed information regarding your particular problem!

POWELL VALVES

THE WM. POWELL CO. CINCINNATI, OHIO

Through The Centuries With Alkalies

Making the First Liquid Bleach or Javel Water at the Javel Works near Paris

The value of chlorine for bleaching textiles and paper has been known for over 100 years. In 1787 it began to replace lyes and sunshine for bleaching but was difficult to use till 1792 when "Eau de Javelle" or soda bleach liquor was introduced at the Javel works near Paris. A few years later "chloride of lime", a bleaching powder containing 35% available chlorine was introduced by Charles Tennant of Glasgow.

When we close a contract for COLUMBIA LIQUID CHLORINE or any other COLUMBIA product, we by no means consider our task finished. Your money brings you more than just so much Liquid Chlorine, Soda Ash or Caustic Soda.

Back of every shipment is a sincere determination to supply you with nothing but the best . . . to understand and meet your requirements in every detail . . . to have your order delivered safely and free from impurities, in perfect, trouble-proof containers . . . in short, to see the job through.

COLUMBIA LIQUID CHLORINE is shipped from our Barberton, Ohio plant in 16 and 30 ton single unit and 15 ton multiple unit tank cars of latest design; also in 100 and 150 lbs. cylinders.

COLUMBIA

SODA ASH
CAUSTIC SODA
SODIUM BICARBONATE
MODIFIED SODAS
LIQUID CHLORINE
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THE COLUMBIA ALKALI CORPORATION
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HOWARD M. HUBBARD, Sec.-Treas.
Harris-Seybold-Potter Co.

ON July 28, 1914, there broke out in Europe the catastrophe of the Great War which plunged the world into economic and moral bankruptcy. The terrific dislocation of the economic mechanisms which therefore had controlled industrial enterprise, and the severe shock to the social philosophy of millions of people has resulted not only in the great depression of 1929-1938, but of perhaps even greater importance, in the revolution of thinking on the part of a large per cent of the world's population. Ideas and points of view developed through generations of experience on the part of our ancestors overnight have been subject to serious question, if not outright disregard. These changes have shown themselves in many ways. We see the collectivist states of Italy, Germany, Russia and Japan, where the individual has been subordinated to the State. We see the great democracies of France, England and the United States rocked to their very foundations by industrial and social unrest.

As might be expected in times of stress and uncertainty, many prophets have appeared, each with an Utopian solution for the ills afflicting a dizzy world. This phenomenon is not new in the annals of modern history, but never before have the dislocations been so severe or prolonged, and never before have the means of mass discussion and communication been so highly developed. Turn on the radio at almost any hour and one may hear a fervid discussion of world or local affairs. Unfortunately, the man with the revolutionary idea, the great solution to all of our woes, is most aggressive in merchandising his panacea to a bewildered people. As in the past, the more conservative element of society, those with the greatest experience and the greatest ability to think clearly are, because of an unfortunate inertia, slow to meet these attacks with the result that ways of evolution are on the defensive and are given the unescapable appearance of having no defense to the charges of the revolutionary. This is a very serious situation and one which must have the immediate and aggressive consideration of all those who desire to retain the economic and social fundamentals upon which this country has been built. Surely a country that possesses 7 per cent of the world's population and an overwhelming proportion of the marvelous devices contributing to the comforts of living should be able to pilot our industrial and social affairs through the storms of adversity.

It is only necessary to be a casual reader of contemporary literature to realize that the solutions of these problems which are being crystallized in the form of legislation are essentially political in character and are based primarily upon the political expediency of the moment. It is equally obvious that political expediency is synonymous with the accumulation of votes, and that the accumulation of votes is based upon the development of emotional reaction rather than a calm consideration of underlying principles and ultimate effects.

The present situation is especially vulnerable because of its very nature. The perplexing ramifications of economic and social problems present difficulties to the minds best trained to understand them. Therefore, it is little wonder that to the man in the street the situation is bewildering and that he becomes fair game for the economic and social horse doctors of the era. The "something for nothing" philosophy is most alluring as political medicine and yet it is perfectly obvious that such a philosophy in the long run can beget nothing but economic and social chaos. The enjoyment of *having* depends absolutely upon the toil of producing, and you can no more have the one without the other than you can have a bountiful harvest without rain.

The situation in which we find ourselves today constitutes both a warning and challenge to American industry—a warning, because it so clearly indicates that we have neglected certain elements of our responsibility under the pressure of mechanical and material achievement; a challenge, because if we are to retain the position of leadership which is rightfully ours, and if we are to retain the elements of democracy and free enterprise upon which this country has been founded, we must cast aside the lethargy and self-satisfaction of past accomplishments and aggressively revamp our policies in the light of current conditions. Failure to do this ultimately can have but one result, namely that some other organization, be it political or otherwise, will assume the leadership which we have forfeited by default.

The seriousness and the vital character of this situation belatedly is becoming apparent in the thinking of industrial executives and has furnished the topic of discussion for numberless meetings of one kind or another, but, unfortunately, it has been very difficult to translate words and ideas into tangible action and policies. It is all very well to promulgate platforms for American industry, but unless those platforms are translated into action they are futile.

As a practical matter, the solution to this problem lies not in the hands of Government, or in the hands of associations, but, rather, it is the personal responsibility of every executive in American Industry to see that his own house is in order. He must acquire a social consciousness which will be new to many executives. He must translate this social consciousness into corporate policies which will recognize the factor of human relationships, and, further, will indicate a recognition that after all, industry serves not only to produce profits for capital but also to provide jobs, homes and the many things which make life enjoyable to the millions of people who make up the rank and file of our American citizenship.

In recent years we have made tremendous strides in a material sense, and it is undoubtedly safe to say that from the standpoint of industrial development and scientific achievement America heads the list among the nations of the world. Material development alone is dangerous unless we form at the same time and parallel with it a comparable social philosophy which will constitute a basis for the proper control of material society. This phase of development has not been what it should have been. To achieve a proper balance in philosophy and resultant policy, it is imperative the individual executive enlarge his thinking beyond his product and the four walls of his establishment. He must

be able to sense the underlying trends and hence be in a position to guide his own affairs in a realistic manner. It will be necessary to recapture the respect and confidence of the employees. The successful executive must realize that the employee is interested in the business and in those things which effect his job and the welfare of his home. The average employee is looking for information and if we fail to supply it as his employer and natural leader, then it will be furnished from other directions. In other words, the employee is at the cross-roads where he must choose his leadership for the future. Is it to be the leaders of American industry, or is it to be someone else?

There is another vital problem affecting the policies of American business which must not be overlooked. The essence of many of the political solutions to our economic and social ills is in general a combination of high prices, inflation and decreased production, that is the economy of scarcity. It takes but little imagination and understanding to perceive the fallacy of this theory if we but stop to realize that real worth is in the production of commodities and utilities and not in their reduction or in the mere printing of paper substitutes in the form of money. If we are to enjoy more, we must produce more. There is no other way. This places upon American industry a two-fold problem, one of which is education and the dissemination of sound economic and industrial ideas, and second, the incorporation of these ideas in terms of industrial policy, looking toward the production of more goods at lower costs to the consumer. Expressed another way, our objective is an increase in the real purchasing power of the people so that their ability to acquire and enjoy a larger amount of this world's goods is assured. This is not an easy task for the allure of the "something for nothing" philosophy is the economic will-of-the-wisp of the day.

The normal stimulations toward personal achievement and accomplishment are being systematically undermined in many ways. There is a growing dependence upon the State at the expense of self-reliance and individual initiative. A new sense of class consciousness, foreign to American ideals of democracy, has reared an ugly head under the leadership of the demagogue. The wheels of production are increasingly hampered and the spirit of free enterprise is seriously imperiled. The challenge to industry is obvious and insistent. We must bestir ourselves, before it is too late, in meeting misinformation with facts and in dispelling the delusions now clouding the thinking of large masses of people. We must attack with renewed vigor the problem of economic stability and the increase in the standard of living for the people as a whole. This means the production of more goods at less cost and involves great problems in engineering, manufacturing and finance as well as the utmost in co-operation between labor and management. The American standard of living already achieved is tangible proof of what can be done and the responsibility for its preservation and future expansion rests with industry and all straight-thinking Americans.

In the last analysis it will be the collective force of hard-hitting, straight-thinking, socially-minded executives of American business which will retain the institution of American democracy and free enterprise.

Cellulose Research, 1933-37

A Resume PART II—MISCELLANEOUS INVESTIGATIONS

LOUIS ELSBERG WISE, Ph.D.

Holocellulose

An interesting analytical development has been the so-called "holocellulose" determination devised by the Forest Products Laboratory. This fraction which is obtained by alternate treatments of wood (free from extraneous material) with chlorine and alcohol-pyridine *(1)* or better yet with chlorine alternating with 95 per cent alcohol containing 3 per cent monoethanolamine *(2)*.

These methods serve to delignify the wood without removing *any* of the carbohydrate portions. In fact, the holocellulose may be considered the sum total of the non-lignin substance of the cell wall, very similar to the "skeletal substance" previously isolated by the use of ClO_2 by Erich Schmidt. One of the remarkable findings as a result of the holocellulose determination is that this residue on hydrolysis (in the case of spruce) yields a certain percentage of methoxyl groups, acetyl and carboxyl groups, as well as glucose, mannose, arabinose, xylose, and galactose. If this hydrolysis is not complete, but carried out with 1 per cent H_2SO_4 it leaves a residue similar to Cross and Bevan cellulose. (The major portion of the methoxyls is of course associated with lignin, but in oak some 20 per cent of the total MeO is found in the holocellulose.) The advantage of using ethanolamine over pyridine is the absence of unpleasant fumes and a fairly sharp end point on complete delignification *(3)*.

Optical Properties

In the previous article, mention was made of the "long chain" molecules of cellulose. Larger, fully visible units, which are aggregations of such molecules are the fibrils. Within these, the more perfectly the micelles (or chain molecules) are oriented in the direction of the fiber axis, the higher are the refractive indices in the directions parallel and perpendicular to the fiber axis. Recently, Preston *(4)* has confirmed the earlier work of Frey *(5)*.

In the case of ramie cellulose, in which a very high degree of molecular orientation exists (or, to put it differently, in which the "dip" or angle of inclination to the fiber axis is practically zero) he found the values for axial ($\eta\delta$) and transverse refractions ($\eta\gamma$) to be 1.596 and 1.528. The double refraction ($\eta\gamma$-$\eta\delta$) was 0.068. Flax cellulose gave identical figures, but cotton showed 1.578, 1.532 and 0.046 respectively. In the latter case, the angle of inclination calculated from the axial refraction was 30°. The transverse refraction gave, however, an angle of about 14°. The average of these two values confirms the measured value determined experimentally by Balls *(6)*, 15 years ago.

The discrepancy between the increase in transverse refraction, and the decrease in axial refraction is accounted for by Cox *(4a)* who believes that chemical and mechanical treatment of fibers serve to rupture (in part) the "association" of cellulose chains in the micel.

The effect of removing extractives from fibers was shown by Kanamaru *(7)* to be slight, but perceptible. His calculations for the double refraction ηγ-ηδ, in the case of perfectly pure, perfectly oriented cellulose gave a figure of about 0.076—although the value found by him was 0.071 (which is close to that found by Preston). Kanamaru *(8)* has also shown that while moisture has little effect on transverse refraction, it influences the axial refraction. However, dry cellulose and cellulose at 100 per cent relative humidity show identical refraction indices. This is not true at intermediate stages of relative humidity.

Esterification of cellulose *(9)* evidently causesa decrease in refractive power. The polar hydroxyl groups give way to weakly polar ester groups.

Stamm *(10)* has pointed out that the excellent agreement of figures for different celluloses having a high degree of orientation (e.g., ramie, nessel, and flax) argues in favor of the identity (in chemical structure) of various forms of cellulose.

Frey-Wyssling *(11)* in studying dispersion of native and mercerized celluloses has confirmed the findings that by determination of the double refraction (which changes from 0.068 to 0.049), it is possible to differentiate between native and hydrated celluloses. The decrease is in harmony with the change in the crystal lattice.

The refractive power of cellulose is a function of the degree of swelling. It decreases continuously and slowly with increased swelling. This was shown by Meyer and Frey-Wyssling *(12)*. The immersion, not the imbibition method, should be employed, although the latter may be resorted to if the time periods are kept very short.

The nearly complete orientation of crystallites (micelles) in ramie were also shown by the X-ray studies of Sisson and Clark *(13)*. The other extreme was in the so-called "compression wood". The authors also studied the effect of tension (and mercerization) on orientation of cotton cellulose.

Wergin *(14)* has made X-ray studies of cellulose of various ages, both in the case of cotton and of the epidermis of *Avena coleoptiles* and in other plant tissues. Up to a certain period (the 35th day of growth) there seems to be no X-ray evidence of the presence of cellulose. Its precursor is termed "primary substance". Only after this period of growth has elapsed does the typical fiber diagram appear.

Cellulose "Solvents" and Sols

A brief but very important review of the effect of dispersion media on cellulose is given by Stamm *(15)*. Whether there are actually any aqueous cellulose "solvents", which cause no change in the chain molecules is a moot question. Hence solution of cellulose may also involve cellulose degradation.

According to Beutel and Kutzelnigg *(16)*, liquid bromine dissolves cellulose completely. While incompletely acetylated cellulose forms sols in various perchlorates, cotton cellulose itself was found to be insoluble in cold and hot solution of sodium, magnesium, calcium and strontium perchlorates. However, according to Dobry *(17)*, it is peptized by a cold mixture of basic and neutral beryllium perchlorates. Lieser's work was referred to, in a previous article *(18)*. His review of the literature as well as his own work indicate that in cuprammonium, cupriethylene diamine, and xanthogenate solutions, cellulose shows micellar aggregates. In organic bases at low temperatures, macromolecules (i.e., chain molecules) may exist, and reform the original micelles as the temperature rises. Traube and Funk *(19)* made studies of the chemical reactions taking place when cellulose dissolves in Schweizer's reagent. The anion, which contains the cellulose, also contains copper, and this is firmly bound. This is joined to a Cu $(NH_3)_4$ cation, which may be replaced by such cations as barium, sodium and thallium by metathesis, thus permitting the formation of various cupricellulose salts.

Certain organic bases peptize cellulose, and the minimum concentration for complete peptization seems to decrease with increasing molecular weight. Lieser and Leckzyck *(20)* found that tetraethyl-trimethyl-p-tolyl-, tetra *(n)* propyl-, and tributyl-ethyl-ammonium hydroxides are all cellulose solvents, that these solutions may be xanthated, and that the tetraethyl ammonium cellulose xanthate is soluble in methanol and acetone. The "ripening" of these xanthates was also studied.

Recent developments (through 1935) in the electrical conductivity of fibers, electrokinetic phenomena, and adsorption of various solutes have been given by Stamm *(21)*. His literature citations are of importance to the interested reader.

Sorption Studies

Studies on the sorption process (especially of water vapor) by cellulose have been very frequent. No attempt can be made to fully cover this field.

In 1935, Argue and Maass *(22)* for the first time measured the heats of wetting of dry cellulose, and showed the influence of the initial water content. They also described a new method for measuring adsorption of water vapor on different cellulose materials, and measured the adsorption and desorption isotherms of a number of cellulosic materials. The early work of Urquhart and A. M. Williams *(23)* was shown to be correct. Argue and Maass also measured the variation of the dielectric constant of water with the extent of adsorption. At the early stages of adsorption, the dielectric constant is less than one-fourth that of liquid water, but it increases with increasing adsorption. The sorption of heavy water (deuterium oxide) by cellulose over a wide range of vapor pressures was very similar to that of ordinary water. After desorption of deuterium oxide, there was a small but perceptible increase in the weight of cellulose—possibly due to an exchange of hydrogen and deuterium atoms. This work was carried out by King and Ouellet *(24)*.

Studying the adsorption of water vapor under conditions that insured equilibrium, Hamm and Patrick *(25)* reported that cellulose exhibited no hysteresis. Sorption of water vapor by paper making materials was studied by Seborg, Simmonds and Baird *(26)*.

They showed that in unbleached chemical wood pulps, the average (equilibrium) moisture content increased about 6 per cent after long beating. With a pebble mill, the results were quite different, due possibly to the mineral matter from the mill adsorbed by the pulp. Bleaching decreased the hygroscopicity of sulphite pulps.

The kinetics of water vapor sorption has been reported on at some length by Lykow *(27)* who suggests two processes that are involved: (1) an external diffusion through the surface layer, and (2) an internal diffusion into the interior of the material. To both phenomena, the Fick law of diffusion may be applied.

Stamm and Hansen *(28)* studied the "bonding force" of cellulose and water, as obtained from specific volume and thermal data. The average force with which water is held (below the fiber saturation point) varies for cotton and pulp. But this force was always greater than that which water has for itself.

A review of the theories accounting for water absorption by cellulose has been given in a long article by Tankard *(29)*. A detailed discussion is given of Champetier's method of determining water of hydration. Tankard believes that cellulose and its derivatives do not necessarily form a limited number of hydrates. However, there seems to be a maximum in each case. For example, for cotton and linen cellulose this maximum is 0.5 moles H_2O per $C_6H_{10}O_5$, and for mercerized (or viscose) cellulose the maximum is about 0.75 mol.

When aqueous alcohols wet dry cotton cellulose, there is a

preferential sorption of water. This was shown by Morrison, Campbell and Maass *(30)*, who for the first time measured the heats of wetting of dry cotton by a number of anhydrous and aqueous alcohols. Sorption of water and of alcohol vapors was also studied by Russell, Maass, and Campbell *(31)*. They measured the water vapor sorbed by various types of beaten and unbeaten pulps at relative vapor pressures ranging from 0 to 100. Beating did not seem to cause any change in the hydration of cellulose. Sorption of methanol and proponal was also studied. An interesting experiment was made with cotton cellulose, dried in a vacuum over P_2O_5. This sample still retained 0.35 per cent H_2O, which could be removed at 100 deg. However, on cooling over P_2O_5, the cotton regained the lost water. The enormous force with which cellulose retains water, a fact long known, is thus quantitatively substantiated both by the work and that (previously cited) by Stamm and Hansen. The authors advance the hypothesis that the crystallites of cellulose are drawn to each other by internal forces during the evaporation of the adsorbed liquids, and that the internal structure is under stresses which are relieved as the liquid re-enters the structure. During the evaporation, bonding between the submicroscopic particles takes places. On desorption, these bondings are broken or "dissolved." Seborg *(32)* found that after desorption, hysteresis in a well beaten sulphite pulp remained unchanged on repeated sorption and desorption over the relative humidity range of 0-95 per cent. The ratio of adsorption moisture contents to the corresponding desorption contents over wide humidities appeared to be a constant for a variety of papermaking pulps. Seborg points out the inadequacy of attributing the sorption hysteresis solely to the number of -OH groups in the cellulose on which water molecules can be fixed.

An entire series of articles on the hydrophylic properties of cellulose has been published by Kanamaru and his co-workers *(33)*.

In certain experiments, the cellulose fibers were rendered electropositive by treatment with cations like aluminum. These showed lowered hygroscopicity and heightened dielectric resistance (over negatively charged cellulose). The effects, however, are largely dependent on the conditions of treatment (temperature, time, concentration, etc.). Wood pulp (and manila) cellulose was also rendered electrically neutral. Changes in hygroscopicity were noted, as the electrostatic conditions changed. At the point of minimum electrostatic charge, hygroscopicity was at a minimum, and dielectric properties at a maximum. When cellulose was treated with solutions of thorium and aluminum salts, increased concentrations (i.e., decreased negative charges on the cellulose) caused decreased hygroscopicity, which very gradually increased in electropositive cellulose.

Cellulose and Alkali Hydroxides

Schramek *(34)* has made an extensive study of the mechanism of the interaction of cellulose and alkali. Analytical and potentiometric data showed that the distribution of alkali between cellulose and the solution was influenced by the kind of cellulose and the temperature. The cellulose fiber is visualized as physically (and possibly chemically) heterogeneous, and it thus becomes impossible to give a satisfactory theory for cellulose reactions or to ascribe definite compositions to compounds of cellulose and alkali. These conclusions are reached after a careful study of X-ray data obtained in noting structural changes in cellulose following the use of alkaline solutions of varying concentrations. Later, Schramek and Succolowsky *(35)* however, made a further investigation of the varieties of products obtained by the action of alkali on cellulose. With 10-20 per cent NaOH they obtained what was termed "sodium cellulose I" and with concentrations above 20 per cent NaOH they obtained "sodium cellulose II". (This was evidently "pure" in concentration above 28 per cent NaOH.) When the reaction mixtures of NaOH-cellulose were diluted, desorption of alkali took place, additional products were formed, and these were finally converted into "hydrated cellulose". That no definite compounds are formed by NaOH and cellulose was indicated by the work of Bancroft and Calkin *(36)*. They described two methods of obtaining "true adsorption" data by the use of the centrifuge. A criticism by Neale *(37)* is that Bancroft and Calkin failed to emphasize the importance of the steady decline of the concentration of (the removed) absorbed solution with progressive powerful centrifuging. The adsorption of alkali solutions by commercial rayon pulps was studied by Fujii *(38)*.

Sakurada and Okamura *(39)* investigated the molecular binding of cellulose by determination of the apparent specific volume and by X-ray studies of the crystallographic units of swollen cellulose. Two cellulose hydrates seemed to be formed: $C_6H_{10}O_5H_2O$ and $(C_6H_{10}O_5)$ $(0.3\ H_2O)$. Sodium cellulose I (obtained from 12-20 per cent NaOH) had the composition $[(C_6H_{10}O_5)\ (NaOH)\ (3H_2O)]$ while sodium cellulose II (obtained from 28 per cent NaOH) approximated $[(C_6H_{10}O_5)\ (NaOH)\ (H_2O)]$. There was also some less firmly established evidence indicating the formation of another sodium cellulose. Hydrazine seems to form a compound $[(C_6H_{10}O_5)\ (N_2H_4)\ (H_2O)]$ (comparable to sodium cellulose II). Nitric and perchloric acids also form additional products.

An interesting reaction between metallic sodium and cellulose is reported by Schorigin and Makarowa-Semljanskaja *(40)*. This is caused by dissolving sodium in liquid ammonia and allowing the solution to react with cellulose. Three hydrogen atoms were liberated with the formation of the unstable $C_6H_7O_5\ (ONa)_3$. The reactions of this compound to form alkali celluloses, xanthates (lower in S than the usual viscose yielding xanthates), and a monomethyl cellulose were described. The latter is not homogeneous, since on hydrolysis it gave glucose as well as a mixture of methyl glucoses.

Cellulose and Liquid NH_3

Barry, Peterson and King *(41)* have shown that when ramie cellulose is treated with liquid ammonia, a substance termed ammonia cellulose (*A*) is formed. When this is heated in the absence of water, so-called "cellulose II" (*B*) is obtained. Compared to the lattice for normal ramie cellulose that of (*A*) shows an unchanged *b* axis, but the *a* axis is increased from 8.3 to 9.83 Å, and the *c* axis is increased from 7.9 to 10.05 Å. Simultaneously the angle between *a* and *c* was lowered from 84 to 53.5°. The space lattice developed for (*B*) above showed the following a:b:c = 7.87:10.31:10.13 (with the angle between *a* and *c*, 58°). Cellulose II, while not identical with hydrated cellulose, has a rather similar space lattice, and seems to be analogous to the hydrated form in increased reactivity and structure. (*A*) when treated with water is regenerated into the native cellulose, and (*B*) when treated with liquid ammonia goes over into (*A*). Hence (*B*) may also be reconverted into native (or "normal") cellulose. Thus (*B*) is analogous to, but markedly different from, cellulose hydrate. These same authors have carried their studies into the action of monoamines on cellulose. Clark and Parker *(42)* also studied the X-ray pattern of cellulose swollen by liquid ammonia. According to their report, the increase in size of the 101 plane of the cellulose lattice was greater than that given by the previous investigators. However, they also found that ammonia cellulose (*A*) could be reconverted into the native form. They reported that the slow evaporation of NH_3 from *A* gave a new cellulose modification (cellulose III). The differences in the X-ray pattern of NH_3-cellulose was, however, due to the fact that while Barry, Peterson

and King made their original measurements in the presence of air, Clark and Parker made their observations in equilibrium with NH_3. In fact, Barry, Peterson and King reported similar results to those of Clark and Parker when this was done, and at the same time that the latter investigators made their report *(42a)*.

Hess and Gundermann *(43)* have also studied the action of liquid ammonia on cellulose, and their results seem to be at variance with those of Barry, Peterson and King, but a critical evaluation of Hess' work would be required before it can be fully accepted.

Another interesting investigation is that of Howell and Jackson *(44)*.

Cotton cellulose filter paper was impregnated with a definite volume of varying concentrations of cobalt chloride. The sheet was then dried, brought into a hermetically sealed, moisture-proof cell and the absorption spectrum was measured. As the cobalt chloride increases, absorption increases and then a point is reached where the increase is quite small. There is a discontinuity which corresponds to a primary coating which *may* be unimolecular. Making this assumption the available surface of the paper was calculated as 1.36×10^8 sq. cm. per g. as against 1.6×10^8 sq. cm. per g. observed by measuring constituent fibers under the microscope. Howell and Jackson admit that their value for available cellulose surface is a maximum one.

Beating and Chain Length

In the preceding article of this series, reference was made to the stimulating work of Staudinger and his associates on the correlation of the molecular magnitude (degree of polymerization) of cellulose with viscosity. That dead grinding *may not change* the degree of polymerization has been indicated by this investigator *(45)*. However, a closer study of Staudinger's work brings evidence that this statement must be modified, and shows that beating *may actually rupture* the threadlike chain of molecules of cellulose. According to Staudinger *(46)*, the smallest native cellulose crystallites are about 0.3 mu in length. On grinding in a ball mill, cellulose fragments are obtained, the length of which approaches 0.1 mu. It is evident then that only when the degree of polymerization is relatively low (about 300-400) does long beating effect no change. In general, the chain molecule is cut down. This is in harmony with the findings of Wislicenus that with increased time of beating the copper number of a pulp increases (up to a point at which it remains constant). It is evident then that beating or grinding of cellulose may involve hydrolytic changes. The so-called (larger) eucolloidal particles are hydrolyzed to the (smaller) mesocolloidal fragments which no longer swell in Schweizer's reagent, which have a higher iodine (and copper) number, and whose nitrates show a lower degree of polymerization than did those of the original material. This is evidently true for cotton, mercerized cotton, and ramie. When the nitrocelluloses are subjected to long beating (in water) an even more marked decrease in degree of polymerization takes place.

In conclusion, it must be said that the above resumé is far from complete. The writer has included reports of researches that have interested him, and which it is hoped will stimulate the reader. Some data are naturally conflicting, and a mere survey of the literature does not always permit a critical evaluation of an investigator's work. Furthermore, since only a fraction of the literature on cellulose investigators has been covered, important researches may well have been omitted in this summary. No technological developments have been included—although readers of the "Technical Developments" sections of this journal must realize that the field has expanded enormously during the past five years. So the article is of necessity incomplete. A comprehensive work on researches on pure cellulose could not be confined to one article. It would entail the writing of a large book.

Erratum: A slight typographical error which appeared in the previous article of this series, should be corrected. On page 415, of the July 1938 issue of this magazine, Dr. Hirst is quoted and a part of his quotation reads: "to an apparent chain length of 500 glucose units." This should read: "to an apparent chain length of 5000 glucose units."

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Preserving Paper Records in the National Archives

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ALTHOUGH, in theory, archival material may be inscribed upon a variety of substances such as paper, parchment, vellum, photographic film and even stone and metal, in actual practice ninety-five per cent of the records encountered in this country are on paper, which is one of the more fugitive of these record bearing media. The useful life of a paper record is controlled by two groups of factors, namely those which are peculiar to the raw materials or processes of manufacturing and those incident to conditions of storage and use. Factors of the second group may be strictly regulated by the archivist, but members of the first group are usually beyond his reach save insofar as his repair operations may compensate for their shortcomings.

The Division of Repair and Preservation of The National Archives was established in 1935 to develop and apply scientific methods for safeguarding Federal records in the custody of the Archivist of the United States. Since no other similar institution has ever dealt with the volume and variety of records now confronting The National Archives, it has been necessary to devise new methods of treating this material and it is the purpose of this article to describe the equipment and procedures now used in the Division of Repair and Preservation.

Fumigation

All incoming material is fumigated to assure complete elimination of insects, fungi, and other similar pests. The operation is carried out in either of two rectangular tanks measuring 4½x5½x11 ft., which are shown in Figure 1. The records are placed in a vault in their original containers and the vault is evacuated until a vacuum of approximately 29.9 in. of mercury is obtained. A mixture of ethylene oxide and carbon dioxide is then released into the chamber until the vacuum falls to 21 in. of mercury. The gas is then agitated for 15 minutes by pumping it out at the top and in at the sides of the chamber. After the records have been exposed for a total of 3 hours the chamber is reevacuated to 29.8 in. of mercury, the vacuum is broken with air, and the fumigated materials are removed. Insects in any stage of development, as well as any mold spores which may be present, are effectively exterminated by this treatment.

Figure 1—Vacuum fumigating chambers.

Figure 2—Cleaning records with an air stream.

During the fiscal year just past, 100,526 units ranging in size from a single volume to boxes weighing 1200 pounds were fumigated.

Cleaning

After fumigation the records are cleaned by means of an air blast applied through an especially designed gun. This method of cleaning was adopted after the completion of an extensive series of experiments for the purpose of determining the safest and most rapid method of removing dust and dirt from fragile records. The methods examined included hand dusting with a brush and with a soft cloth, vacuum cleaning, and the air blast.

The cleaning operation is performed in an all-metal cleaning unit composed of two hooded tables and an air filter. This equipment is shown in Figure 2. The working surfaces and the backs of the tables are of heavy bronze screen through which is drawn the dust-laden air blown from the records. The dirty air passes through ducts within the tables into the filter, which removes the dust and returns the clean air to the room. From time to time as it becomes necessary, the filter mats, which are of cellulose wadding, are cleaned with a vacuum cleaner. This new method has given excellent results since its initiation early in 1936, and similar equipment is now being installed in several other archival depositories elsewhere in the United States.

Figure 4—Flattening documents.

Fig. 5—Preparing records for lamination with cellulose acetate foil.

Approximately 45,000,000 documents and 50,000 bound volumes were cleaned during the fiscal year 1937.

Flattening

The next step in the treatment of unbound records is the removal of folds, wrinkles, and creases to permit storage in a horizontal position. In order to obtain satisfactory flattening it is first necessary to render the paper fibers flexible by the addition of water, but the use of liquid water on documents dating later than 1840 is dangerous, because of the water soluble nature of many of the inks and other writing materials used since that date. In The National Archives, therefore, documents to be flattened are exposed on stainless steel trays to the action of air containing a large amount of water vapor (90 per cent to 95 per cent relative humidity). This exposure, which is carried out in a vault equipped for the purpose, (see Figure 3) generally lasts about an hour, during which time the paper absorbs water in the vapor phase, thus eliminating any possibility of the formation of a liquid layer upon the surface of the document. When satisfactory humidification has been attained the documents are removed from the vault.

If the material under treatment is in reasonably good condition, the individual sheets are ironed in electrically operated mangles equipped with thermostatically controlled, electrically heated shoes. These machines (Figure 4) are similar to household ironing machines. On the other hand, if the documents are fragile or fragmentary in character, each sheet is placed between sheets of white blotting paper and dried under heat and pressure in a hydraulic press. Approximately 685,000 sheets have been flattened to date.

Repairing

The two varieties of archival material (i.e., unbound and bound) handled by The National Archives require radically different treatment to prepare them for preservation, and it was necessary to devise a specific technique for each type of work. In the case of unbound records, which constitute approximately 90 per cent of the material handled thus far, an investigation of the various methods of repairing and reenforcing such material indicated that all the procedures commonly used for this purpose, prior to the entrance of The National Archives into the field, involved the manual application of an aqueous adhesive and some re-enforcing substance such as Japanese tissue paper or a coarsely woven silk fabric (crepeline). Such treatment increases the durability (resistance to the wear and tear of handling) of the document but does not improve its permanence qualities (resistance to other deteriorating influences such as light, heat, and acidic gases). Moreover, the operations involved are tedious and delicate and require skill obtainable only through long training and experience. Consideration of these facts indicated that the task of treating millions of documents by such methods was well-nigh impossible.

The ideal preservation process is one in which the documents are sealed permanently against the harmful gases of the atmosphere, in which no adhesive is necessary, and in which the various operations may be performed rapidly and easily by workers of average intelligence and ability. Such a process had been proposed by the National Bureau of Standards for the preservation of newsprint as early as 1934 (see Bureau of Standards Miscellaneous Publication Number M-154, Summary Report of Bureau of Standards Research on the Preservation of Records, by A. E. Kimberly and B. W. Scribner). As a result of research in the Division of Repair and Preservation, this process has been successfully adapted for use on all common varieties of paper.

According to the modified procedure developed, a docu-

Figure 3—Humidifying vault.

Figure 6—Hydraulic press used for lamination.

Figure 7—Stack area for record storage.

ment to be repaired is placed between two sheets of thin cellulose acetate foil (.00088 in. thick), which, being thermoplastic, adheres to the paper upon the application of heat and pressure in a hydraulic press. The preparation of a document for lamination is shown in Figure 5. The degree of heat and pressure necessary varies with the type of paper under treatment. Documents so treated are relatively impervious to gases and if necessary may be cleaned with soap and water. Tests of the permanence of laminated records by the National Bureau of Standards indicate that they are unaffected by the normal processes of deterioration. Moreover, the cost of treatment by this process is only 25 per cent of the cost of preservation by other methods.

The hydraulic press (see Figure 6) now in operation in The National Archives will take material as large as 21x36 in. and has an annual capacity of 400,000 letter-size sheets. An added advantage of the process from the archival viewpoint is the fact that once a document has been laminated with cellulose acetate foil, alteration of the document is exceedingly difficult, if not impossible.

Archival binding or the repair of bound records differs from library binding in that every effort is made to preserve the records in their original form and binding. The technique employed is, therefore, almost diametrically opposed to edition or library binding operations, which involve the replacement of torn covers and the like. A record is kept of the extent of the work performed on each volume.

Control of Storage Conditions

The preservation of records requires close control of the temperature, relative humidity, sulphur dioxide content, and dust content of the air in the storage spaces. The optimum conditions of temperature and relative humidity for satisfactory storage are 70 deg. F. plus or minus 2 deg. and 50 per cent plus or minus 2 per cent. As an aid in controlling the temperature and moisture content of the air within these narrow limits, wet and dry bulb temperatures are determined twice daily at two or more stations on each tier of every occupied stack area. The number of such daily determinations made at present is 112 and more data of this sort will be gathered as the number of occupied stack areas (see Figure 7) increases.

Since it has been shown that concentrations of sulphur dioxide as low as 1 part sulphur dioxide in 5,000,000 parts of air are definitely harmful to paper and other record materials, the elimination of this acidic gas from the atmosphere of storage areas is highly desirable. It has been found that if the hydrogen ion concentration of the water used to wash the air prior to its introduction into the storage areas is maintained between pH 8.5 and 9, sulphur dioxide is completely removed. The alkalinity of the wash water is kept within this range by the addition of small amounts of chemicals, and determinations of the pH of the wash water are made hourly as an aid in this program.

It is desirable to reduce the dust content of the air in the storage space to a minimum, for angular dust particles exert

Figure 8—View of the chemical laboratory.

an abrasive effect on records and also act as nuclei for the condensation of acidic moisture. The dust content of the air delivered by each air washer is, therefore, determined daily, and the results are plotted over a period of time so that some idea of the progress made in dust elimination may be obtained. A view of the chemical laboratory of The National Archives is shown in Figure 8 on the preceeding page.

It is believed that The National Archives is the first archival depository to utilize scientifically trained personnel in the treatment of archives with respect to repair and preservation and the results so far obtained have been quite satisfactory.

Acoustical Board
FROM CORNSTALK PULP

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WITH the increasing noise consciousness of the public has come an increased demand for sound proofing and sound absorbing materials. The latter are being made from a variety of substances and exist in varying degrees of efficiency. These sound absorbing or acoustical boards are used in correcting an undesirable condition known as reverberation. When sound is produced in a room it is reflected back and forth between the walls, ceiling, and floor. Each time the sound is reflected it is reduced in intensity depending upon the absorbency of the reflecting surface. If the reflected sound remains audible for an appreciable length of time it mingles with the sound being produced causing not only the undesirable effect known as reverberation but also raising the sound level of the room. The time required for the sound to decrease to one millionth of its original intensity is known as the reverberation time of the room. This reverberation time is dependent upon the area of absorbing material, the absorbency of the material, and the number of times the sound falls upon the reflecting surface. Since the velocity of sound under ordinary conditions varies only slightly the number of reflections may be taken as proportional to the distance it travels or to the volume of the room. This is all expressed in the formula for reverberation time as given by Sabine

$$T = \frac{0.05V}{A_1S_1 + A_2S_2 + \ldots}$$

in which T is the reverberation time in seconds, V is the volume of the room in cubic feet, S_1, S_2, ... are the area of the different surfaces in square feet and A_1, A_2, ... are the absorption coefficients of the materials making up the areas S_1, S_2, ... This formula assumes a drop in sound level of 60 decibels or to one millionth of the original value. Another formula by Eyring is

$$T = \frac{0.05V}{-S \log_e (1 - \alpha)}$$

in which S is the total surface exposed in the room in square feet and α is the average absorption coefficient of the various surfaces. It is evident that the substitution in a room of part of the area by more highly absorbent material will reduce both the sound level and the reverberation time.

Since earlier work at Iowa State College showed that insulating board of varying densities and hardness could be produced from cornstalks it was assumed that acoustical or sound absorbing boards could also be produced. Studies were therefore made of both the effect of variation in types of pulp used in forming the board and in the effect of various surface treatments upon the finished board.

Table 1—Effect of Pulp Composition Upon the Coefficient of Absorption of Acoustical Board

No.	Kind of Pulp	Percent paper	Coefficient of absorption at frequencies (in c.p.s.) noted, percent				
			256	512	1,024	2,048	n.r.c.*
1	Mechanical...	0	37.5	54.9	56.8	51.5	50.3
2	Mechanical...	9	40.7	48.4	44.4	45.1	44.7
3	Mechanical...	18	39.3	44.6	41.1	43.5	42.2
4	Steamed.....	0	38.1	49.6	48.1	48.5	46.6
5	Steamed.....	9	34.8	43.8	42.0	45.0	41.5
6	Steamed.....	18	——	34.9	32.1	41.8	——
7	Cooked.....	0	48.3	59.0	49.9	49.3	54.1

*Noise reduction coefficient—that is, the average coefficient for the frequencies (in c.p.s.) given in the table.

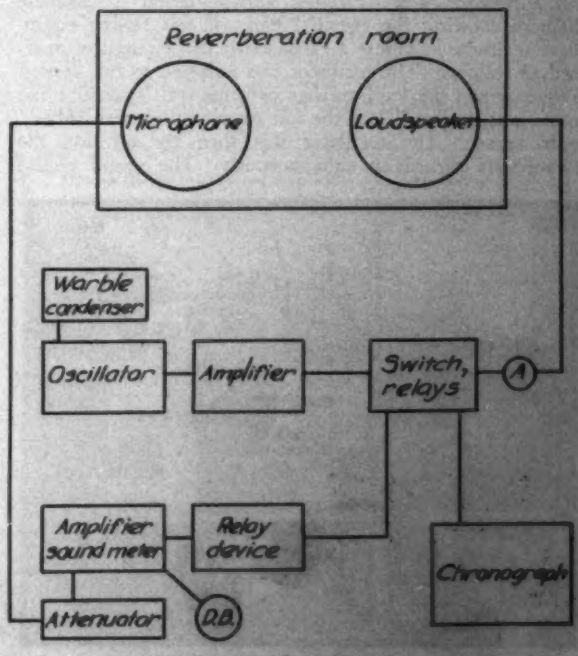

Figure 1—Schematic diagram of testing equipment

Table 2—Effect of Number of Grooves Upon the Coefficient of Absorption of Acoustical Board

No.	No. of grooves*	Coefficient of absorption at frequencies (in c.p.s.) noted, percent			
		256	512	1,024	2,048
T2.8	0	39.4	44.5	45.1	50.0
T2A	10	71.4	71.3	71.9	71.3
T2B	20	76.5	78.2	74.7	72.9
T3	0	43.1	43.0	39.4	48.6
T3A	10	63.2	66.5	67.8	63.8
T3B	20	76.6	77.5	70.3	76.7
T4	0	58.3	57.2	53.9	53.2
———	10	76.1	74.5	73.7	69.6

*Grooves 1/8 in. wide, 1/8 in. deep, 9 1/4 in. long. Boards 12 by 12 in.; beveled.

Before making these studies it was necessary to have an accurate means of determining the sound absorbent coefficients of the boards. The usual method is to determine the reverberation time of an empty room and then the time for the same room with a measured amount of acoustical board in it. The coefficient of the board is then calculated from these data and one of the reverberation time formulas. In addition to having available a suitable room with relatively high reverberation time it is necessary to have means of producing sounds of required frequency and intensity and a means of measuring the time required for the sound to die down in the room to the proper level. The most satisfactory means of producing the sound is by an electrical oscillator with suitable amplifier and loud speaker. In early work at Iowa State College the timing was done by the ear and stop watch method. That is, the duration of the sound was determined by timing with a stop watch operated manually by the operator who judged the lower sound level by the ear, the level used being the point when the sound was no longer audible.

The present studies were made using automatic equipment designed and constructed by Prof. H. J. Plagge of the Physics Department, Iowa State College, and D. E. Anderson, Supervisor, Works Progress Administration. A schematic diagram showing the essential parts of this testing equipment is shown in Figure 1. Essentially this equipment operated as follows: The oscillator was adjusted to the desired frequency and the loud speaker switched on. The amplified sound was projected into the test room until it was "filled" with sound. The oscillator was then cut off and the microphone turned on simultaneously. The sound picked

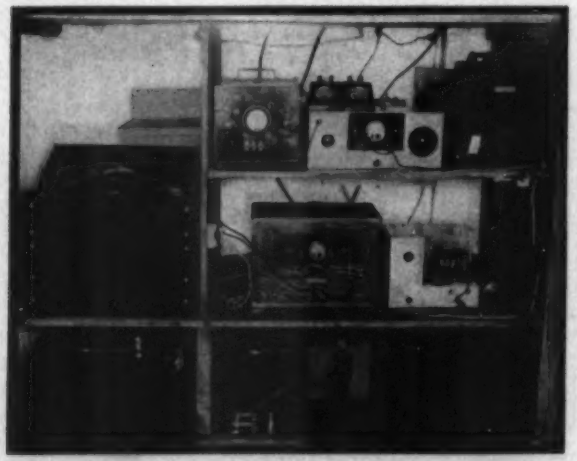

Figure 2—Apparatus used in acoustical tests

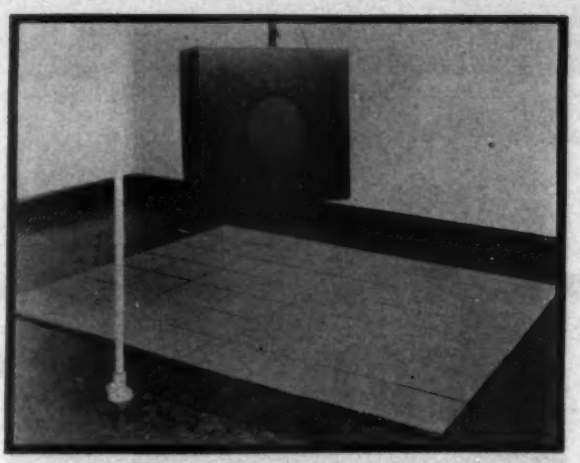

Figure 3—Reverberation room showing loud speaker and board on floor

up by the microphone was amplified so as to operate a marking device. This device marked a line on a piece of paper tape beginning as the sound was cut off and stopping when the sound level had dropped 60 decibels. Since the tape was driven at constant speed by a chronograph the length of the line was a measure of the time. The reverberation time was thus determined directly for an actual 60 decibel drop. It was determined for the following frequencies for each sample: 128, 256, 512, 1,024, and 2,048. The absorption coefficients for the last four of these frequencies averaged together gave the noise reduction coefficient (n.r.c.). The sound absorption coefficient is the percentage of the sound absorbed by the material, based upon the total sound falling upon it.

Since boards from different types of pulp showed differences in such characteristics as strength, appearance, and density, studies were made to determine whether or not they would show differences in acoustical properties. Three general types of pulp had been developed in the laboratory: mechanical, steamed, and cooked. The mechanical pulp was produced by merely shredding dry mature cornstalks and then refining these (with water) in a rodmill followed by a Bauer fibrator. The shredded stalks for the steamed pulp were boiled in water at atmospheric pressure for three

Table 3—Effect of Number of Holes in Hard-Surfaced Board Upon Coefficient of Absorption

No.*	No. of holes †	Coefficient of absorption at frequencies (in c.p.s.) noted, percent					
		128	256	512	1,024	2,048	n.r.c.
15	0	25.7	22.9	25.9	24.5	26.6	25.0
15A	64	40.4	39.8	48.5	36.8	44.4	42.4
15B	113	49.3	56.8	69.7	60.9	46.2	58.4
15C	225	53.8	60.8	84.2	82.6	59.5	73.6
15D	421	61.8	59.6	78.4	78.8	69.4	71.6
6	64	41.8	41.6	40.3	41.5	40.0	40.8
6A	120	56.2	53.8	54.3	52.5	53.9	53.6
6B	176	64.2	63.2	64.9	64.8	59.6	63.2
6C	225	68.0	70.9	70.2	75.6	67.1	70.9
6D	481	77.7	78.2	76.3	88.5	74.8	79.4

*No. 6 was made of two 1/4-in. steamed pulp (18 percent paper) boards faced with a 3/16-in. pressed board; No. 15, same except mechanical pulp and 1/16-in. pressed board. Boards were tested about one year apart. Data at 128 c.p.s. for No. 6 series probably is too high; No. 15 is much more accurate at this frequency. Values above 225 holes are not very accurate because surface of board was altered by closeness of holes.

†The number of holes given is for pieces 11 1/2 in. square (No. 6) and 12 in. square (No. 15).

Table 4—Absorption by Hard-Surfaced Hollow Board

No.	Coefficient of absorption at frequencies in (c.p.s.) noted, percent					
	128	256	512	1,024	2,048	n.r.c.
*PB**	—	12.5	18.1	21.9	20.9	18.3
40†	30.4	31.9	38.5	39.5	42.4	38.2
T40‡	36.8	48.7	57.0	55.5	70.2	57.9
T40A§	53.5	58.3	76.3	76.0	64.3	68.7

*Pressed board from cooked pulp 1/8-in. thick, 24 in. by 30 in. with 1,280 holes 1/4-in. in diameter.
†Steamed-pulp (9 percent paper) board 1/2-in. thick.
‡Built up from *PB* and 40.
§No. *T40* with hollow space filled with finely shredded insulating board.

hours before refining. Those for cooked pulp were digested in water at 50 pounds steam pressure. All three types of pulp were sized by the addition of 3 per cent rosin size and 6 per cent aluminum sulphate (alum). The board was formed from the pulp in the forming machine previously described in this journal (*1*), pressed between press rolls, and dried in a tunnel type of dryer. Shredded waste paper was added to some of the mechanical- and steamed-pulp boards after the first refining but prior to the addition of the rosin size and second refining. The amount of paper so used is designated as per cent paper of the total pulp used, all calculated to a dry basis. To secure a uniform thickness all boards were made slightly more than 1/2 inch thick and sanded to exactly 1/2 inch.

A comparison of the sound absorption coefficients of boards from the three types of pulp shows that mechanical pulp board in spite of the greater harshness of fiber was the most effective sound absorbing material (Table 1). This greater sound absorption probably resulted mainly because of the lower density and the correspondingly less compact structure of the mechanical pulp board. The board from the cooked pulp used in these tests was not as compact as some boards of this type produced in the laboratory. This together with the softer fibers gave it a higher sound absorption than the other boards. All of these boards were formed and pressed under as nearly identical conditions as practical to eliminate variations other than type of pulp and to give representative boards for each type.

To increase the strength of mechanical and steamed pulp boards, repulped waste newsprint is sometimes added to the cornstalk pulp. Since this tends also to produce a more compact board it would be expected to reduce the sound absorption. This does occur as is shown by experimental data (Table 1 and Figure 4).

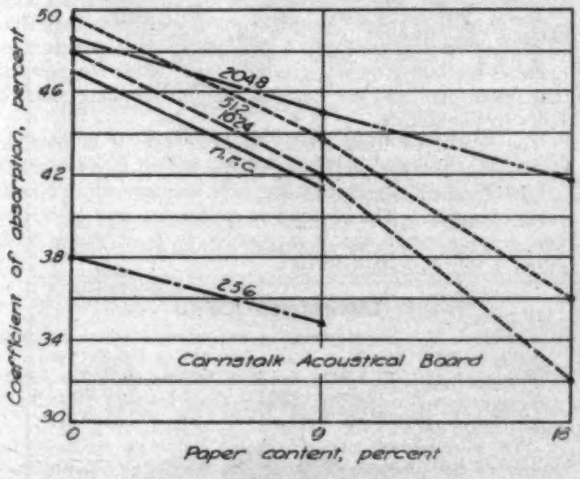

Figure 4—Effect of paper content upon sound absorption

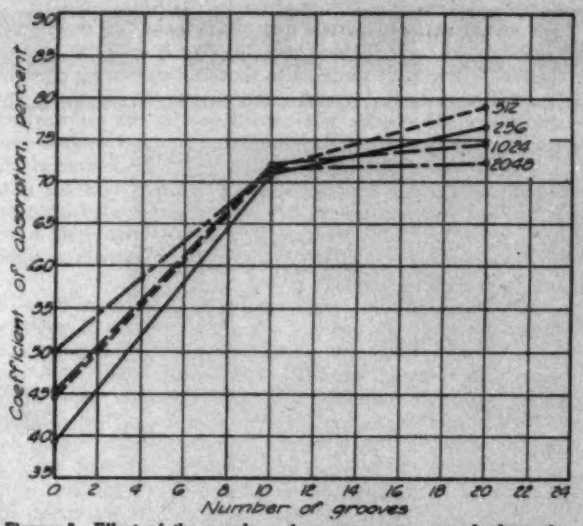

Figure 5—Effect of the number of grooves upon sound absorption

Commercial acoustical boards are frequently in the form of "tile" in relatively small sizes, such as one foot square, with the edges beveled and sometimes with holes in the surface. While many such boards are known to be efficient sound absorbing materials there is little in the literature in regard to the specific effect of either bevels or openings such as holes upon sound absorption. Earlier work at Iowa State College by Plagge, Arnold, and Whittemore (*2*) showed that while sanding the surface of cornstalk board did not appreciably affect its sound absorbing qualities, beveling the board did increase sound absorption. Beveling the board increases the area of the surface exposed to the sound but the sound absorption increased three times the amount which could be accounted for by this increased area. It is believed that the increased absorption is caused by the exposure of the "edge grain" of the board at the 45-degree angle of the bevel. Because of the formation of the board (*1*) the fibers lie with their axes in all directions and the bevelling exposes many fibers cut off at various angles with their longitudinal axes with irregular voids between them. Such a sur-

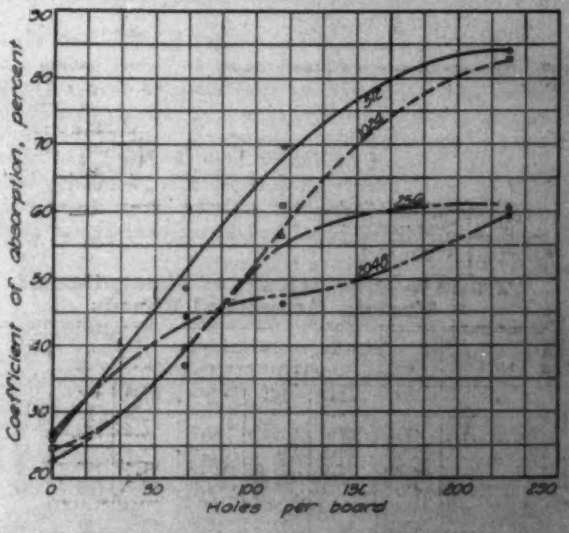

Figure 6—Effect of the number of holes upon the sound absorption

face would be more porous than that on the top or bottom of the board where the fibers lie largely parallel to the surface. These early studies also showed that cutting grooves ⅛ inch wide and ¼ inch deep materially increased the absorption. This work was carried out by the ear method of determining the reverbation time.

In the present studies two boards ½ inch thick were glued together to give a 1-inch board. The board was cut into 1-foot squares which were bevelled. Ten parallel grooves each ⅛ inch wide, ⅜ inch deep, and 9⅞ inches long were cut into each board. After testing, 10 more grooves at right angles to the first 10 were added.

The results (Table 2 and Figure 5) show an increase in absorption at all frequencies when the number of grooves is increased to 10 and 20. These results, while showing the same general trend, are not in close agreement with the earlier work. A comparison of the results will show, however, that the boards used in the earlier work had a lower initial coefficient. It is to be expected that it would be more difficult to increase absorption of a board with a high initial coefficient than one with a low coefficient. The values secured in the present studies should be more accurate than those from the earlier work.

The soft acoustical board while excellent as a sound absorbing material does not have the necessary resistance to wear for use in some locations. In an effort to develop a board which would be free from this objection a board was made by gluing together two ½-inch insulating boards of steamed pulp (with 18 per cent paper) and facing them on top with a piece of 3/16-inch pressed board of the cornstalk pulp. This pressed board was made from cooked pulp and was dried under pressure in a steam heated hydraulic press so as to produce a board about four times as dense as insulating board and much harder. The pieces of board tested were 11½x11½ inches and not beveled. Each piece was drilled with 64 holes ¼ inch in diameter by ¾ inch deep. After testing more holes were added, giving numbers shown in Table 3. The results of the tests showed that the increase in coefficient of absorption was almost proportional to the number of holes up to 225 holes per board. When more holes were added the character of the board was changed so that the results are not considered significant. The increase in sound absorption was out of proportion to that which might be accounted for by the area of the openings. However, the sides of the holes should be very absorbent because of the edge grain effect. It is also known that sound will pass through openings such as these and come together on the other side without much decrease in intensity.

Another hard surfaced board tested was No. T40, Figure 7. A piece of pressed board 24 by 30 inches, having 1280 holes ¼ inch in diameter, was mounted over a ½-inch insulating board upon ½-inch strips, thus giving a hollow board. The coefficients of the pressed board, of the insulating board base, of the hollow built up board, and of the built up board filled with finely shredded insulating board were determined (Table 4). It is of interest to note that the hollow built up board had a coefficient almost exactly equal to the sum of the coefficients of the two parts of which it was made.

A hollow board built up entirely of ½-inch insulating board (No. T9, Figure 7) was tested. This board was beveled and had ten grooves reaching within 1/16 inch of the hollow space (T9A). After testing, the grooves were cut through into the hollow part (T9B). This type of board showed the largest coefficient of absorption for given amount of raw material of any tested (Table 5).

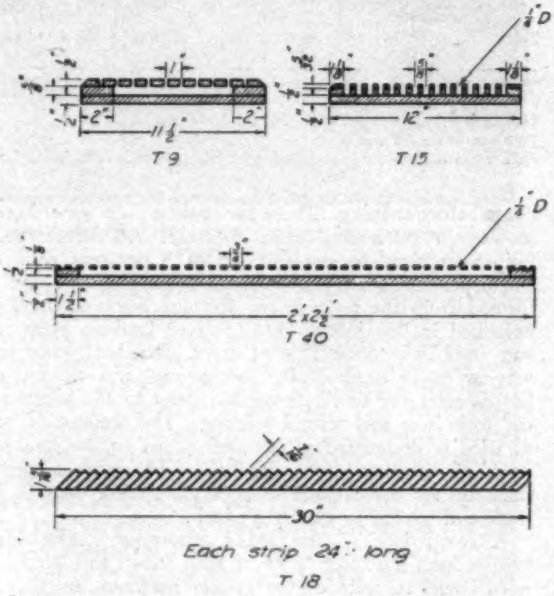

Figure 7—Cross sections of various boards tested

Another type of board is No. T18, Figure 7. This was made by gluing strips of ½-inch steamed pulp board together at 45 degree angle. The results did not show much improvement in coefficient over an ordinary board of the same amount of material (Table 5). It will be noted that sound striking upon the board at certain angles would strike a hard glue layer before passing through much of the board. This probably accounts for the relatively low absorption.

By applying a layer of paper pulp to the surface of the board it should be possible to produce a board of any desired color. To determine the effect of such a paper layer upon the sound absorption the coefficient of absorption of a board was determined both before and after spraying with paper pulp. The paper coating reduced the noise reduction coefficient from 52.0 to 37.5 percent. At the higher frequencies the reduction was greater than at lower frequencies. The board used was not beveled and did not have slots or holes in the surface.

The results of these studies indicate that it is possible by varying the type of pulp used and the surface treatment of the finished board to make excellent acoustical boards from cornstalks. The absorption coefficients may be varied over a wide range and it is possible to have boards with either a soft or a hard surface.

Table 5—Coefficients of Absorption of Various Acoustical Boards

No.	Coefficient of absorption at frequencies (in c.p.s.) noted, percent						Area, sq. ft.
	128	256	512	1,024	2,048	n.r.c.	
T9	57.1	52.4	55.6	50.2	56.8	53.8	50.1
T9A	57.8	62.5	71.9	72.6	83.5	72.4	43.5
T9B	66.8	76.9	93.9	87.6	81.5	89.9	40.6
T9C	65.3	70.2	89.0	94.9	72.2	85.7	40.6
T18	49.7	60.0	70.7	66.6	66.9	66.1	55.1

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1. Arnold, L. K. "Development of a Forming Machine for Insulating Board." *The Paper Industry* 19:935-38 (Nov. 1937).
2. Plagge, H. J., L. K. Arnold, and E. R. Whittemore. "The Surface Treatment of Acoustic Tile." *Paper Trade Journal* 96, No. 6:27-29 (Feb. 9, 1933).

——The work reported in this article is a part of the regular Station project on the production of insulating board from cornstalks.—*Author's Note.*

PAPER SKETCHES

IN 105 A.D. 10,000 SHEETS OF PAPER, CONTAINING COPIES OF THE CHINESE CLASSICS, WERE MADE UP BY ORDER OF THE EMPEROR OF CHINA FOR PRESENTATION TO THE ROMAN EMPEROR. IN THOSE DAYS, PAPER APPEARS TO HAVE FREQUENTLY BEEN THE GIFT OF ORIENTAL SOVEREIGNS TO OTHER MONARCHS.

UNIVERSAL USE OF PAPER WINDOWS IN ORIENTAL HOMES HAS BEEN GIVEN AS ONE OF THE REASONS WHY THERE IS APPARENTLY LESS RICKETS AMONG CHINESE CHILDREN THAN AMONG YOUNGSTERS OF THE OCCIDENT. IT HAS BEEN DISCOVERED, FOR EXAMPLE, THAT THE PERCENTAGE OF TOTAL ULTRA VIOLET TRANSMISSION IS REMARKABLY HIGH THROUGH PAPER WINDOWS OF THE POPULAR CHINESE TYPE.

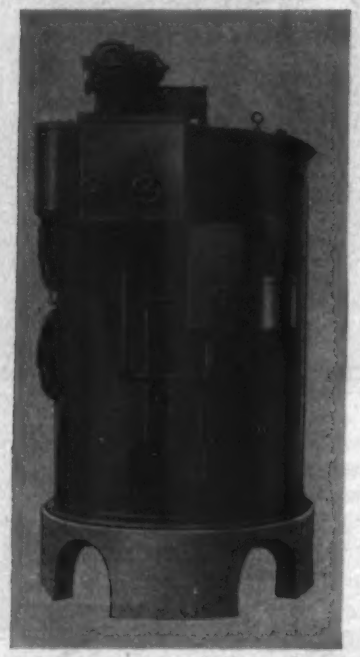
LIGHT WEIGHT STRAW PAPER, SHIPPED TO CUBA DURING THE MID-1800'S, WAS USED TO MAKE FILLERS FOR HAVANA CIGARS. SUCH PAPER WAS SATURATED WITH EXTRACT PREPARED FROM THE STEMS AND REFUSE OF HAVANA SEED LEAF, MINGLED WITH EXTRACTS OF LICORICE ROOT, SENNA, ETC., AND WAS STAMPED TO LOOK LIKE GENUINE TOBACCO, LEAF VEINS BEING IMITATED SO SKILLFULLY THAT EVEN EXPERTS COULD SCARCELY DETECT THE PRACTICE.

KRAFT PAPER, ACCORDING TO A PUBLISHED REPORT, IS BEING USED IN GERMANY IN THE MAKING OF CONCRETE HIGHWAYS. THE PAPER, IN LONG, WIDE STRIPS, IS LAID OVER THE SUB-BASE AND RECEIVES THE CONCRETE. SUCH CONSTRUCTION IS SAID TO GIVE A CERTAIN RESILIENCE TO THE COMPLETED ROAD.

NEW EQUIPMENT AND SUPPLIES

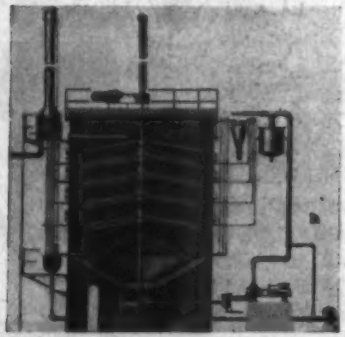
Fiber and Sludge Thickener

Graver Tank & Mfg. Co., Inc., East Chicago, Ind., has announced the development of a tray-type device for the concentration of sludges incident to the recovery operations of soda and sulphate pulp mills



and for the recovery of fiber and other suspended solids as contained in paper mill white water.

This device, designated as the Seip Clarifier, may have anywhere from one to seven trays. Each tray is round, is inverted, and is supported by brackets attached to the inside of a vertical, cylindrical tank of welded steel plate construction.



Space is left between the inside tank surface and the edge of each tray for a peripheral feed channel which is fed by several inlet pipes located around the tank periphery beneath the surface of the material being treated. To make the entrance to the lower trays easier, and to remove the concentrate from the tray tops, the entrance to each settling chamber is larger than the entrance to the chamber above it, and the distance from the tank periphery to each tray is proportionately larger than the distance from the periphery to the tray above.

A large stilling chamber at the top of the clarifier is provided to take care of any fluctuation in feed, and, from this chamber, the material being treated flows slowly downward through the peripheral feed channel and is evenly distributed into each tray, the space within each tray forming a settling chamber for the solids in suspension.

Immediately above each tray is a set of scrapers for removing the concentrate. These scrapers are operated through a central shaft by a variable speed motor located on the top of the clarifier. Mounted on the outside of the clarifier is a concentrate level indicator, which enables the operator to tell at a glance the level of the concentrate bed on the top of any one of the trays.

There is a liquid draw-off in the top of each chamber. Each of these draw-offs is located near the central shaft as far as possible from the intake pipes to allow for the longest possible settling time.

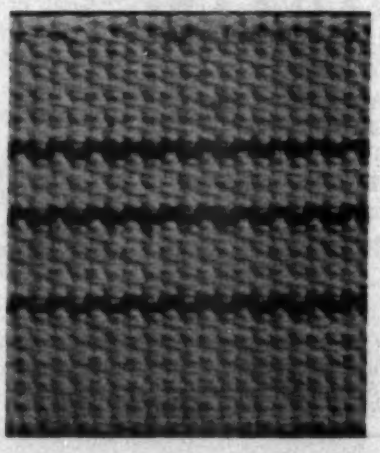
The main tank of the clarifier has a conical bottom with a slope of approximately 30 degrees. This bottom, equipped with a set of scrapers, receives the final concentrate. The scrapers move this concentrate to a pipe opening that connects with a concentrate pump which elevates the material to an overhead concentrate tank for gravity discharge.

Easy access to the inner working parts of the clarifier is provided through manholes and doors.

The clarifier, in addition to being furnished complete, can be accommodated to any existing tank.

Leather Belting Rebuilt

Sudbury Laboratory, South Sudbury, Mass., has announced three kinds of rebuilt leather belting for pulp and paper mill power transmission applications—one of oak leather; another, known as Chrometex, of chrome leather; and the third, a cone belt with oak leather for the back and chrome leather for the face. In each case, used leather belting is employed in the construction of the belt, such leather being joined to a

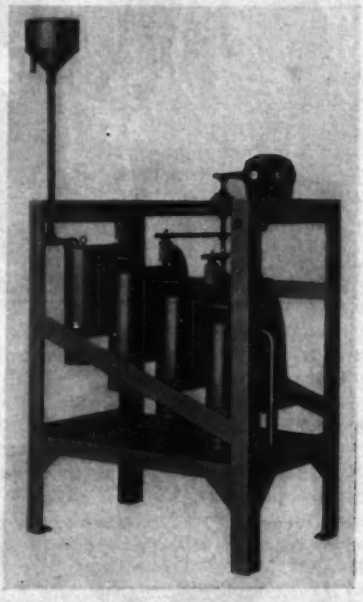


cotton fabric of Sudbury Laboratory design and manufacture. This fabric, in the case of the two belts other than the cone belt is used as a backing; while, in the cone belt, it is used as a center. These belts, according to the manufacturer, give the same coefficient of friction as a leather belt combined with the tensile strength, straight running qualities, and uniformity of a fabric belt. The manufacturer also states that the belts can be made 100 per cent waterproof, if desired.

Customers may or may not furnish old leather for use in the making of the rebuilt belts.

Fiber Classifier

The Bauer Bros. Co., Springfield, Ohio, has announced a device, designated as the McNett Fibre Classifier, for separating any sample of pulp or paper stock in fluid suspension into a number of fractions, each of which will contain fibers of approximately



the same general size or characteristics. This device utilizes four tanks that are linearly positioned within an open frame in a cascade arrangement. Each tank is equipped with a screen cloth and with an agitator. The mesh of the screen cloth in each tank can be of any size; but commonly it is of a definitely decreasing ratio from the first tank to and including the last tank. One standard series uses wire cloths of 20, 35, 65, and 150 mesh. Another series starts at 14 mesh and ends at 100; while a third begins with 28 mesh and ends with 200.

In operation, the stock sample (10 grams bone dry weight) is placed in the first tank where it is mixed with about 14 liters of water. The stock mixture thus formed next is subjected to the action of a stream of water which is directed into the first tank from a graduated orifice at a definite rate per minute (usually 3 gallons). This stream of water, running through the screens, tends

to carry any fiber that will pass the mesh of any given screen and, in so doing, separates the sample into four fractions. After a certain length of time, the circulating water is shut off; the agitators stopped; and the total content of each tank drained upon a separate lawn cloth filter arranged below it. Each of these four filter cloths then can be doubled over, passed through a wringer, and the individual fraction retained by each cloth weighed. The weighing may be done wet for approximate work; or the fraction may be oven-dried, previous to weighing, for more accurate work. If a fraction is weighed damp and fiber contents figured from an established moisture content, a sample can be run in approximately 30 minutes from the time it is ready for the Classifier.

Steel Strapping Tool

Acme Steel Company, Chicago, Ill., has developed a new automatic seal-feed tool, known as Acme No. 2 Steelstrapper, for applying ⅜ in. and ¾ in. steel strap to heavy shipments, including skid loads. In

operation, one lever of the tool tensions while a second lever seals the joint and cuts the strap from the coil without waste. Seals for the tool are furnished in clips of fifty; and an equal number of steel straps can be applied before reloading the seal magazine.

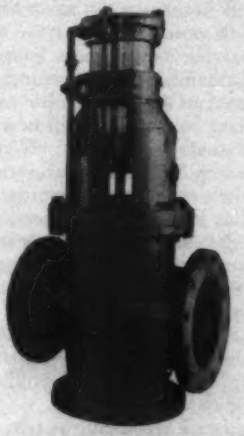
Paper Roll Truck

The Service Caster & Truck Co., 670 North Brownswood Ave., Albion, Mich., has announced the development of a hand-operated truck for the handling of paper rolls. This truck makes use of a heavy-duty

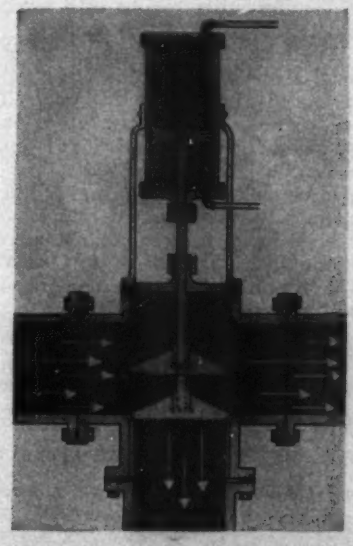
hydraulic cylinder for slowly bringing its load to a horizontal position. A roll, in being lowered, may be stopped at any angle through the action of two foot pedals at the rear of the truck. The frame of the truck is of arc welded steel construction. Each of the two front wheels, which are designated as load wheels, has a diameter of 11 in. and a tread of 2⅞ in.; while the diameter of each of the two rear wheels is 6 in. The four wheels are equipped with Hyatt bearings. A pair of pipe handles, a special paper roll nose piece, and a chain and hook for anchoring a roll on the truck are among the truck's other features.

Hydraulic Stock Valve

A non-clogging stock valve, equipped with a hydraulic operating cylinder, has been announced by the Lake Shore Engine Works, Marquette, Mich. The valve is designed to replace the usual tee at the junction of main and branch lines. Due



to its hydraulic operating features, it can be controlled from remote centers and also can be arranged for automatic operation. A three-way water operating valve handles the pressure or discharge of the hydraulic cylinder's two-way piston. Float mechanisms also can be used in connection with the control cylinder so that the main valve will



retain constant level or constant pressure in the branch discharge. Closure of the valve is secured by seating a metal disc on a seat, the diameter of which equals that of the branch line. The disc travels vertically and does not obstruct main line passage when the valve is set for different degrees of full opening. The valve keeps branch lines free of stock except when in actual use. It is made in 6 in., 8 in., and 10 in. sizes; and is designated as Dur-A-Bel.

Push Button Stations

Push button stations of one to four units have been developed by Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., for heavy duty service where protection from fumes, dust and

moisture is desired. They are of heavy cast iron finished with weather-proof aluminum paint. Mounting holes are easily accessible on outside of cases; covers are sealed with cork gasket and oil-treated paper; and rust-resisting materials are used throughout.

A maintained contact unit, obtained by using a standard momentary unit with an interlock unit, also is available.

Sodium Chloride Tablet Dispensers

A new line of sodium chloride tablet dispensers has been put on the market by the Industrial Products Company, 809 W.

Somerset Street, Philadelphia, Pa. The line includes two models, one designated as Industrial Model B-3, the other as Utility Model B-6. Both designs are of plastic moulded construction; are waterproof; and are provided with lock top and key. The capacity of Industrial Model B-3 is 1500 tablets; that of the Utility Model B-6, 350 tablets.

ALLIED

SIMONDS SAW AND STEEL MOVES INTO NEW PLANT

COVERING four and one-half acres of ground in East Fitchburg, Massachusetts, and of the most modern design and construction, the huge windowless plant of the Simonds Saw and Steel Company will soon house the main Fitchburg saw and knife plant, the Fitchburg file and hacksaw plant and the Chicago plant of the company, as a result of a recent decision of the company to consolidate all the latter units under one roof.

The cornerstone of the factory was laid December 20, 1930, and the plant, completed in 1931, attracted national attention through articles in *Fortune, Time, Popular Mechanics,* and other magazines, because of its unique design—the first windowless, air, light and humidity controlled factory in this country.

The Simonds Saw and Steel plant is 360 by 562 feet and is so designed that it may be enlarged on all four sides. The building was built for straight line production, the work entering at one end, flowing through in a straight line and coming out at the other end in a finished product, there being ample means provided at each end for either loading or unloading railroad cars or trucks. The main building of the plant is entirely supported on steel trusses, the walls being used simply to control the temperature and light conditions as well as the acoustical properties in the plant. The walls are made of acoustical cinder block faced outside with brick in modernistic effect.

Of especial interest is the fact that the building has no windows, no skylights, no shadows, no stairways, no elevators, no partitions, no noise and no foul air. The artificial light provided by specially designed lamps, equals the natural sunshine on a May day and is constantly maintained at 20 candle power. Despite the outside weather, the temperature within the plant is maintained at a constant level best suited to working conditions. The head room in the plant will be entirely free from all obstructions. There will not be any pipes, conduit, wires or any other obstructions coming down from the ceiling. It is intended that the plant shall have no partitions whatever, separating any of the units from the other. Even the office is to be located in a corner of the building without partitions, the idea being to absorb all noise and vibration as near the point where it is produced as possible.

A separate ventilating system is provided for each section of four lavatory units, this being automatically controlled; the operation of the unit being to draw air from the interior of the plant through the lavatories and then forcing it outdoors. Water is provided through a spray with the temperature predetermined by thermostatic control so that the water will be of a given temperature in all of these units.

The roof structure is made up of Johns-Manville Holorib, inverted and perforated, and filled with a one and one-half inch layer of rock cork. On top of this are two one-half inch layers of Cytex which is covered with a three-ply felt base. The lighting of the building is accomplished with 720 combination Mercury and Mazda lights which have a capacity of 650 watts. The Austin Company designed and built the plant.

"The original idea of building this windowless factory," said G. K. Simonds, general manager, in making the announcement, "was to provide working conditions for the factory employees which would equal those of any executive office. It was found through experience that the amount of light in the ordinary plant with windows varied greatly in the different seasons of the year as well as on bright and cloudy days. It also was found that the variation in temperature in the ordinary plant, due to atmospheric conditions, would be improved if the temperature could be controlled. It was also found that noise was disturbing to workmen and anything that could be done to eliminate this noise would lesson the strain on the operators. Therefore, it was decided that the nearest approach to ideal conditions for our employees could be obtained only through the development of such a windowless plant."

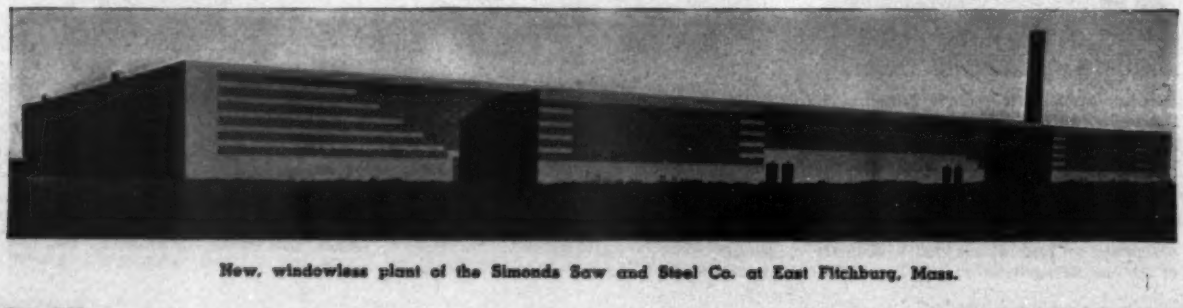
◆

ELECTRICITY AIDS IN PAPER CUTTING

There will be no more wavering in "the straight and narrow path" of paper cutting if electricity is used, according to F. H. Gulliksen, electronic control engineer of the Westinghouse Electric & Manufacturing Company, who described his invention for this purpose before the recent convention of the American Institute of Electrical Engineers in Washington, D. C.

Mr. Gulliksen's invention utilizes a single phototube, amplifiers and a small reversible motor to follow a narrow guide line on long rolls of paper, enabling them to be wound evenly from uneven rolls and slit in perfectly straight lines. Light from a small lamp passes through four small circular lenses revolving 1,800 times per minute on the shaft of a synchronous motor and strikes the roll of paper as four rapidly revolving light beams. This light is then reflected back to the phototube whose resistance increases as the illumination from the paper decreases.

As long as the light beam strikes only the light surface of the paper roll, the resistance of the phototube remains uniform, but as soon as the



New, windowless plant of the Simonds Saw and Steel Co. at East Fitchburg, Mass.

beam intercepts the dark-colored guide line on the paper roll, the phototube gives a signal to a reversing motor which, by means of a gear arrangement, adjusts the position of the unwinding roll transversally to bring it into a straight line again.

The phototube controls the operation of the reversible motor by means of a high vacuum amplifier and sequence interlocked thyratron tubes, supplying armature voltage to the motor.

◆

▸▸▸ BLAW-KNOX COMPANY, through its Power Piping Division, is completing, ahead of schedule, the general mill piping for the new Irvin works of Carnegie-Illinois Steel Corp. This piping installation is one of the largest ever undertaken in connection with an industrial project. It involves about 60 miles of piping, ranging in size up to 48 inches in diameter, and includes lines for high and low pressure steam; filtered, raw and city water; hydraulic systems up to 3,500 pounds pressure; air, fuel and acid supply; and circulating oil and grease systems.

◆

NOPCO ACQUIRES VITAB COMPANIES

Expansion of the manufacturing and service facilities of the vitamin divisions of the National Oil Products Company by the purchase of the plants of the Vitab Companies, California corporations, has been announced by Perc S. Brown, vice-president of the Harrison (N. J.) company.

With the acquisition of the Vitab Companies, the National Oil Products Company extends its vitamin operations into all phases of the food, dairy, baking, pharmaceutical, drug, and animal husbandry industries. Nopco is the pioneer in the Vitamin D milk field with the manufacture of Vitex concentrate from cod liver oil for use in Vitamin D fluid milk, also the pioneer in the agricultural field with the manufacture of Nopco XX—a standardized, fortified cod liver oil for controlled vitamin feeding of poultry and farm animals.

An exchange of National Oil Products Company stock was made for all the assets of the California companies. The former Vitab Companies are being dissolved. Named "The Vitab Corporation," the new corporation is capitalized at $500,000 and becomes a wholly owned subsidiary of the National Oil Products Company. Plants are at Emeryville and San Francisco, California.

Officers of the Vitab Corporation are: Charles P. Gulick, president; Perc S. Brown, vice-president; Ralph Wechsler, treasurer, and A. A. Vetter, secretary. Officers of the Vitab Companies were: E. H. Heller and A. K. Humphries, of San Francisco, and Charles L. Bowman, of New York.

◆

CHICAGO OFFICE FOR EIMCO CORP.

The Eimco Corporation of Salt Lake City, Utah, manufacturers of continuous vacuum filters and other modern equipment for the paper and chemical process industries, announces the establishment of a new branch office at 333 North Michigan Avenue, Chicago, Ill.

F. E. Kurz and Paul Richter, both formerly connected with Oliver United Filters, Inc., are in charge. Their wide experience in solving filtration problems assures superior service to present or prospective users of Eimco products throughout the Middle Western States and Central Canada.

◆

METAL TESTS DISCUSSED BY J. S. VANICK

Alloy steels and alloy cast irons are now being produced with hardness values approaching so closely that of the diamond that standard methods of measuring hardness of metals are no longer sufficiently exact to meet modern industrial requirements, according to J. S. Vanick of the Development and Research Division of the International Nickel Co., Inc., who stressed this point at the annual meeting of the American Society for Testing Materials at Atlantic City recently.

Reporting on a year's study in collaboration with his colleague, J. T. Eash, Mr. Vanick described how various steels and a special nickel-chromium alloy cast iron has been tested by the four accepted methods of measuring the hardness of metals.

◆

G-E LABORATORY WARS ON "CRIME"

Microphysical and microchemical methods are employed in "crime" detection by Dr. H. H. Race of the General Electric Research Laboratory at Schenectady, New York. The culprits are electrons, or ions, and the crime is the destruction of electric cables undergoing severe laboratory tests.

For several years Dr. Race has been working in the Schenectady laboratory with miniature samples of high-voltage, oil-impregnated, paper-insulated cables. Under high-voltage stresses, electronic or ionic bombardment of the paper causes it to carbonize and burn through, layer by layer, leaving behind the culprit's finger-prints. An examination of the paper will show, for instance, how the bombardment pounded away at the paper, branching out over its surface until the ions or electrons eventually found a weak spot and burned through, only to begin operations again on the next layer of paper. As these agents of destruction progress through the layers of paper, they tend to spread out, damaging larger areas until complete electrical failure occurs. With the damaging evidence available, the identity of the culprits is unquestionable, and the laboratory investigator can thereby assist the engineer in improving cable design.

◆

▸▸▸ THE NORMA-HOFFMANN BEARINGS CORPORATION, Stamford, Conn., has just completed an extension to its present buildings. This addition is due to an increasing demand for its ball, roller and thrust bearings.

◆

NEW CAFETERIA AT WESTINGHOUSE

The Westinghouse Electric & Mfg. Company climaxed the serving of 10,000,000 meals over a 45-year period with the opening of a new $100,000 employees' cafeteria at the East Pittsburgh works. On the first day, 1,200 men and women employees enjoyed lunch in the air-conditioned cafeteria. Thirty chefs and waitresses served them in two shifts and the 30,000 watts of indirect light—more than enough to illuminate 100 ordinary living rooms—cast a shadowless glow over 100 modernistic micarta tables trimmed with stainless steel.

Food is served from a 100-foot stainless steel counter, a gigantic buffet table designed to harmonize with the room's pastel shades of pink, green, ivory, and white.

Paradoxically, the diners are surrounded by quiet, soft lights and clean air in the very midst of some of Westinghouse's heaviest construction projects. The cafeteria is directly over the Shipping Department, and adjoins the Generator Division in which powerful cranes are continually handling heavy power equipment, but no noise reaches the ears of the diners. Engineers have soundproofed the room. Its walls, floor and ceiling are fire-proofed, and there are no windows to admit dust and glare from the sun.

◆

▸▸▸ SMITH & WINCHESTER, South Windham, Conn., announce the shipment of five bag machines to Hollingsworth & Whitney Paper Co.

TECHNICAL DEVELOPMENTS

The following abstracts are of the latest developments found in the foreign press.

Degree of Sulphonation in Sulphite Cooking

If the sulphite cook is pushed far enough, appreciable quantities of lignin may be extracted with water alone or with aqueous solutions of salts, without previous exchange of cations. This means that it is possible to prepare easy bleaching pulps from strong pulps. This cooking process presents little interest since the pulp yield is not increased and since there is always a danger that the pulp strength will decrease. If, at the early stages of the cook, aqueous extraction is resorted to, when the lignin of the wood is only partially sulphonated, black cooking results. This is probably due to the partially sulphonated lignin, which resinifies easily. There is evidence that the first sulphonation leads to the freeing of groups which are protected from resinification by the presence of sulphite liquor. Evidently an active carbonyl group (in the lignin) is involved in the reaction. These conclusions have been reached as the result of laboratory experiments. In all series, a cooking liquor having the composition 4.5%, total SO_2 and 1% CaO was used. In a so-called direct cook—after the maximum temperature (135 deg. C.) was reached—it was maintained there for about 7 additional hours, the experimental digester being so arranged that tubes containing definite samples could be withdrawn at 1 hour intervals and examined for yield, Roe number and pH of the liquor. In a so-called 2 stage cook, which was similarly carried out, the sulphite action for all samples was interrupted permanently after 10.5 (or 11 1/6) hours, the samples withdrawn simultaneously, washed, and heated for varying time intervals with pure water. In this two stage cook the Roe number decreased (but not as rapidly), and the yields were slightly higher than in the ordinary (extended) control digestion. Other experiments are also described (with ample tabulated and graphical data) that justify the conclusions regarding the importance of sulphonation. Erik Hägglund and Sixten Arnold. Papier-Fabr. 36, 266-72 (1938).

Mechanical Pulp

The grinding process, considered from the theoretical standpoint, is a complex one. Proof is offered, however, that it is dependent on the laws of pure friction. The authors, in their introduction, attempt to utilize the views prevailing in the realm of technico-physical friction in explaining or at least throwing some light on grinding phenomena. A study was then made of the influence of the grinding angle and of the sharpening of the pulp stone. Here, too, an effort is made to find a generally applicable theoretical basis instead of the empirical relationship ordinarily used up to the present in studying the grinding process. Studies were made with straight, spiral, thread, diamond and quilled (stift) burrs in stone sharpening. These are shown in Figure 1, together with the corresponding results obtained on a specific stone, the unsharpened surface of which is shown in the lowest cut. For details of this very comprehensive research, the original article must be consulted. These involve simple mathematical treatments, and include numerous graphs showing the effect of grinding pressure, speed of revolution of pulp stone, area, temperature of grinding, pressure on burr during stone sharpening, etc. on grinding. Walter Brecht and Wilhelm Müller. Papier-Fabr. 36, No. 23, 24 and 25, 189-98; 257-65 (1938).

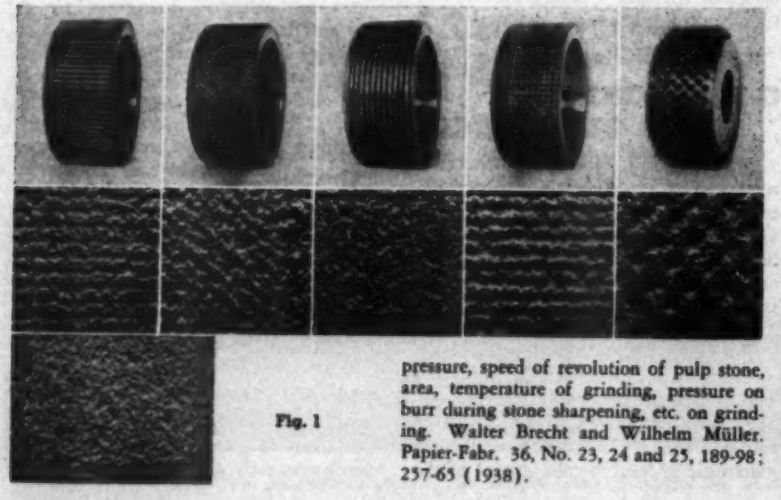
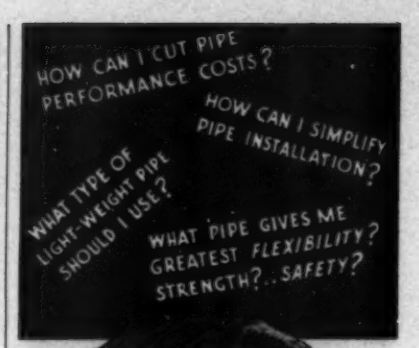
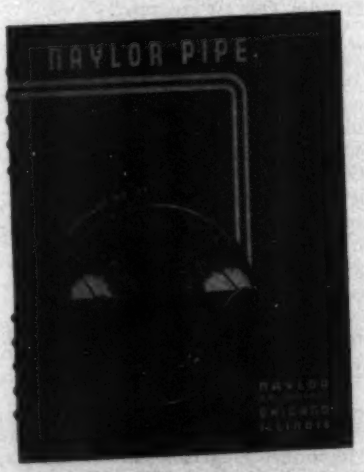


Fig. 1


HOW CAN I CUT PIPE PERFORMANCE COSTS?
HOW CAN I SIMPLIFY PIPE INSTALLATION?
WHAT TYPE OF LIGHT-WEIGHT PIPE SHOULD I USE?
WHAT PIPE GIVES ME GREATEST FLEXIBILITY? STRENGTH?.. SAFETY?

NAYLOR'S FREE CATALOG GAVE ME THE ANSWERS



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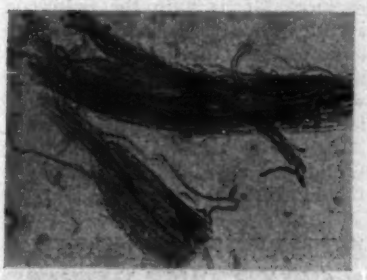
CHICAGO ILLINOIS

Resistant Pure Cellulose of Beech

The usual techniques for cellulose determination give rise to crude cellulose. Hence no definite computations can be made for evaluating possible pulp yields. This is true for beech (as well as other woods). The authors therefore introduce the concept of resistant, pure cellulose, which is determined as follows:—wood samples passing a 45 mesh (per inch) sieve and retained by a 110 mesh screen were obtained. Air dried wood corresponding to 5.0 g. was treated in a thermostat with 125 c.c. 3.5% HNO_3 for 90 minutes, at 80 deg. C. under carefully standardized conditions. The residue is sucked off on a Jena glass filter (11G.2), washed on the filter, free from acid by water, and then with denatured alcohol. The air-dried material is transferred quantitatively to an Erlenmeyer flask and then treated for one hour at 50 deg. C. with 125 c.c. of a solution (containing 2g. NaOH and 2g. Na_2SO_3 per 100 c.c. H_2O). The brownish-black solution is then filtered through a Jena fritted glass filter (as above) and the residue is washed with 1 liter of water and acidified with 50 c.c. 10% acetic acid. The filter cake is allowed to stand again with 50 c.c. of 10% acid, refiltered by suction and washed with water and alcohol, and sucked dry. It is then treated with enough NaClO so that there is present 5% active chlorine computed on the basis of the weight of the residue. Besides this, 1% NaOH (calculated on the basis of the same residue) is added. At a stuff density of 5%, this bleach mixture is allowed to act for 1.5 hours at 35 deg. C. with frequent stirring. At the end of this period, the excess NaClO is titrated, and the bleach consumption computed. Thereupon the material is filtered by suction, washed with 50 c.c. of 0.5% SO_2 (with stirring), followed by water and alcohol. From this bleached material, alpha cellulose is isolated by the method used in the Institute of Cellulose Chemistry at Darmstadt (given in great detail in this paper, and not very different from methods previously published). The weight of alpha cellulose divided by the



weight of the bone dry wood sample taken for analysis (×100) is the per cent "resistant pure cellulose". The experiments leading to the standardization of each step are fully described. It was found that the application of the new method to a large number of samples showed that the percentage of pure resistant cellulose depends on age and wood quality. First class wood, 108 years old, gave the highest figure (36.8%), which is over 10% lower than the corresponding value for spruce wood. The mean difference between wood 30 years old and the wood richest in cellulose was only 3.2%. From the figures for pure resistant cellulose in beech, the minimum theoretical commercial yields of pulp of a given wood may be computed. These theoretical values are quite close to values obtained in practice. This is true for both acid and alkaline cooks. Beech wood furnishes a higher pulp yield by the alkaline than by the acid cooking process. This advantage can only apply to the paper industry, since the higher yield is due to higher amounts of pentosans. The method as outlined may be applied as a control in mill practice. A photomicrograph showing the resistant pure cellulose is given in Figure 1. Georg Jayme and Paul Schorning. Papier-Fabr. 36. 24/25, 235-252 (1938).

How To Operate Paper Mills More Profitably

It took only 5 minutes to break in this felt . . . and it's giving a 50% bonus in service and tonnage!

It could just as well be one of your felts! It can always be depended upon to remain in a soft, porous, absorbent condition, and its fibres are free from loading at all times. Unusual? Not at all! For it was broken in and is regularly cleaned and conditioned with

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. . . the synthetic soap with unusual penetrative and rinsing powers. MAGNUS FELTEX conditions WHILE RUNNING, WITHOUT REMOVING. By increasing the life of the felt, it gives 50%-100% more tonnage per felt, with proportionate savings in labor and down time. Does not weaken wool fibres, nor harden the felt; also completely eliminates difficulties due to "blowing" and "ribboning", and improves "pick-up".

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Benzylcellulose in Preventing Rust

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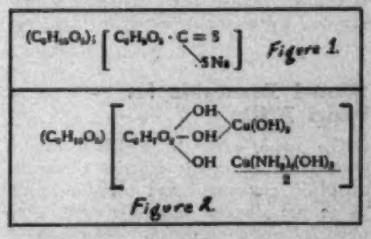
Chemistry of Rayon Process

The author gives a resumé of the nature and constitution of cellulose derivatives which serve in the viscose and cuprammonium processes. It is largely a summary of past investigations at Halle since 1929. What is termed a pseudo-formula for cellulose xanthate, as obtained in the usual viscose process, is shown in Figure 1. In Figure 2 is the pseudo-formula for the com-

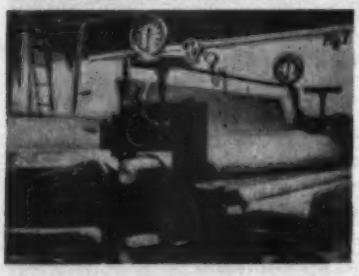


pound formed when cellulose dissolves in cupprammonium hydroxide. It should be understood that in these pseudo stoichiometric formulas, the expression within the parenthesis refers to those $C_6H_{10}O_5$ groups which are situated in the interior of a micel and are not subject to xanthation or to the formation of cuprammonium derivatives, whereas the expressions within the large brackets contain reactive $C_6H_{10}O_5$ groups on the surface of the micel. Analytical data indicate that the ratio between surface groups and interior groups is approximately 1.1 to 1.0. Control experiments with monosaccha-

rides indicate that the xanthate reaction does not occur uniformly on a specifically located hydroxyl group. Perxanthation of the cellulose and its permutoid "coppering" may also be effected by strong quaternary ammonium hydroxides like tetraethyl ammonium hydroxide. T. Liese. Papier-Fabr. 36, 272-6 (1938).

The Statimeter

The instrument permits the actual and accurate measurement of mechanical pressures in any department of the paper mill. Its application, in one specific case of indi-



cating the pressure between a fixed and a movable roll is shown in Figure 1 where the statimeter is situated between the adjusting wheel and roll spindle. Figure 2 is a detailed working diagram showing the same

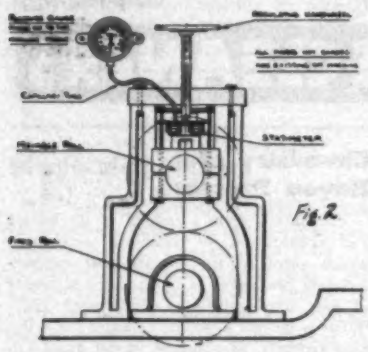


Fig. 2

application. Other uses and advantages of the instrument are given. Anon. Paper-Maker and British Paper Trade J. (Midsummer, International number) 1938, pp. 17-18.

Wood Analysis in Pulp Mills

The author gives 16 analytical control methods which in his experience may be useful in mechanical and chemical mills. These are divided into 4 classes:—(a) physical (involving density and volume of pores), (b) colloidal (involving hygroscopicity under varying conditions of humidity, tangential degree of swelling, degree of impregnation in water and alkali), (c) determination of extraneous materials (moisture, ash, water and alkali-soluble matter, ether extractives and fat determination), (d) determination of main components (acetyl, methoxyl, lignin, pentosans, mannans, holocellulose, and alpha-cellulose). However, in practical mill control work a number of these determinations become unnecessary, and may be omitted. Carl G. Schwalbe. Papier-Fabr. 36 24/25, 223-6 (1938).

Simplified SO_3 and SO_2 Determinations

The simultaneous determination of SO_3 and SO_2 in gases produced in sulphur burners has been greatly simplified. Results with the new method compare favorably with those of Kraus, provided anti-catalysts that prevent oxidation (e.g. ethyl alcohol) are introduced into the Kraus procedure. Otherwise the method of Kraus gives results that are too high in SO_3. [Cf. Z. angew. Chem. 48,227 (1935)] Into the gas outlet pipe from the sulphur burner is placed a glass tube. By means of a rubber stopper, to this glass tube is attached another conically-shaped tube, the wide portion of which is 60 mm. long and 20 mm. wide. This contains an asbestos filter. Connected to this is a 250 cc. gas-washing bottle and in series with it an aspirator flask (5 liter capacity) filled with water with outflow at bottom leading into a measuring cylinder. Into the conical tube are placed 1 g. asbestos or 2-3 g. cotton. This filter serves to condense the SO_3. No alkali must be present in the filter medium. Asbestos is heated with HCl and thoroughly washed. The gas-wash bottle contains 100 cc. 0.1N iodine solution (without starch). Water is drained from the aspirator bottle until this iodine solution is practically decolorized. (The rate of outflow is about 6 minutes per liter). After the volume of water is read, the straight tube is withdrawn and residual gases removed by suction. The filter medium is then quantitatively removed from the conical tube and beaker. Washings from both straight and conical tubes are used to form a suspension with the asbestos (or cotton). For the determination of SO_3, the residual SO_2 in this suspension is first titrated with 0.1N iodine and starch. A drop of 0.02N thiosulpliate dispels the blue color. Then the total acidity is titrated with 0.02N NaOH (Methyl red indicator). The total SO_2 is determined by the number of cc. of 0.1N iodine consumed in the wash bottle plus that residue formed in the filter medium. The original volume of gases withdrawn from the oven, *i.e.*, volume in the cylinder, must, of course, be corrected to 0 deg. and 760 mm. pressure.

The following formulas are used in the calculations. The per cent SO_2 equals

$$\frac{109.5a}{Vo + \frac{109.5a}{100}}, \text{ where } Vo = \frac{V}{1 + \frac{1}{273}t},$$

[in which (t) is the temperature of the gas, (V) the volume of water drained off, and (a) the cc. of 0.1N I.] The per cent of SO_3 may also be calculated very simply. Here, the formula is

$$\frac{f \times 100}{a + f} = \% SO_3$$

[Where (f) is number of cc. of 0.1N. NaOH used, corrected for a blank and also for 0.1N iodine used up in the titration of the asbestos suspension, i.e. for residual SO_2.]

Tabulated data showing the results obtained by the Kraus method and by present procedure are given. The agreement is excellent. R. Schepp. Papier-Fabr. 36 (Tech-Wiss Tl.) 178-80 (1938).

SAFETY

NEKOOSA DIV. IS AHEAD IN NEPCO SAFETY CONTEST

In the first six months' period of the safety contest between the Nekoosa and Port Edwards mills of the Nekoosa-Edwards Paper Company, Nekoosa is leading with but four lost time mishaps to Port Edwards eleven. In other departments not considered in the contest there were five accidents, making a total of twenty-one in all.

A minimum of $1,000 in prize money will be distributed at the end of the year by the company to employees in winning departments. Mill officials state that the cost of lost-time accidents for the first six months of 1938 was approximately half the average cost of the past seven years.

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▶▶▶ AT A RECENT MEETING OF THE SAFETY ASSOCIATION, held in Port Arthur, Ontario, Earl Hutchinson, vice-chairman of the Workmen's Compensation Board, pointed out that accidents were due principally to defective ways, works, and machinery in camps, and to carelessness. Owing to augmented activity in the pulpwood industry since 1934, accidents in this type of industrial work had been sharply on the increase. In 1934, there were 38,000 accidents in timber camps in Ontario, while in 1937 they number 70,582. Accidents in the industry so far this year are slightly below the total for the corresponding period in 1937.

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MENASHA FOREMEN CELEBRATE RECORD

Foremen of the Menasha Products Division of the Marathon Paper Mills Company celebrated a no-accident record at the plant for the month of June at a recent dinner at the Hotel Menasha, Menasha, Wisconsin. Present from the company's main offices at Rothschild, Wis., were E. D. Stoetzel, director of industrial relations and Jack Stevens, assistant general manager. 32 foremen attended the dinner.

The Paper Industry Safety Contest

Tentative 12-mo. Cum. Scores
as of June 30, 1938
8 Mills Finish With Perfect Scores

PERFECT SCORE
Division I—Paper and Pulp Mills

	PARTICIPANT	MILL	LOCATION
A			
B			
C			
D	Bird & Son, Inc.	Phillipsdale	Rhode Island
	Hollingsworth & Whitney Co.	Aroostook & Cobbossee Mills	Gardiner, Maine
	The Mead Corporation	Nashville	Tennessee
	International Paper Company	Mill Number 23	Riley, Maine

Division II—Paper and Board Re-Manufacturing

Bird & Son, Inc.	Chicago	Illinois
Gaylord Container Corp.	Dallas	Texas
Bemis Brothers Bag Co.	East Pepperell	Massachusetts
Bay West Paper Company	Green Bay	Wisconsin

IMPERFECT SCORES

	Key Number	Rank	Disabling Injuries	Frequency Rate
GROUP A	P-139	1	2	1.259
	P- 44	2	3	1.833
	P- 19	3	4	3.050
	P-108	4	11	4.044
	P-121	5	8	4.926
	P- 30	6	8	5.562
	P- 10	7	9	5.936
	P- 13	8	10	5.970
	P- 84	9	12	6.015
	P- 28	10	30	6.636
	P- 12	11	11	7.070
	P- 21	12	10	7.134
	P- 18	13	16	7.525
	P- 1	14	28	8.964
	P- 69	15	17	9.012
	P- 97	16	13	9.130
	P- 9	17	28	10.009
	P-136	18	17	10.533
	P- 11	19	14	11.026
	P- 62	20	23	11.213
	P- 23	21	15	11.359
	P- 27	22	55	12.673
	P-102	23	24	14.042
	P- 73	24	41	15.262
	P- 67	25	47	17.405
	P- 64	26	22	17.672
	P- 87	27	59	27.709
	P- 40	28	58	27.783
	P-140	29	56	33.215
	P- 71	30	52	34.554
	P- 32	31	56	37.063
GROUP B	P- 22	1	2	1.882
	P-135	2	2	2.147
	P-133	3	5	4.855
	P- 72	4	4	5.193
	P- 68	5	6	5.347
	P- 58	6	6	6.115
	P- 4	7	5	6.432
	P- 60	8	7	6.447
	P-142	9	8	9.286
	P-143	10	7	9.296
	P- 59	11	9	10.603
	P- 3	12	12	11.035
	P- 15	13	10	11.369
	P-113	14	14	13.136
	P- 3	15	14	13.336
	P- 16	16	12	13.975
	P-126	17	13	14.477
	P-107	18	17	14.764
	P-122	19	13	15.078
	P- 26	20	14	15.399
	P-123	21	14	15.817
	P- 45	22	15	16.365
	P-137	23	14	17.339
	P-120	24	22	20.824
	P- 25	25	23	22.291
	P-130	26	27	26.193
	P-124	27	24	27.512
	P- 82	28	25	28.862
	P-104	29	26	29.507
GROUP C	P- 55	1	1	1.669
	P- 56	2	3	5.458
	P- 43	3	3	6.760
	P- 89	4	4	7.448
	P-119	5	5	7.832
	P- 61	6	5	9.404
	P- 88	7	6	9.805
	P- 70	8	7	10.338
	P- 37	9	5	11.671
	P- 52	10	8	17.104
	P- 94	11	7	18.700
	P- 46	12	12	19.990
	P- 48	13	10	25.445
	P-103	14	10	36.177
	P-113	15	13	26.606
	P- 47	16	11	28.635
	P- 41	17	20	30.148
	P- 34	18	15	37.406
	P -29	19	19	37.563
	P-111	20	22	39.409
	P- 80	21	19	46.050
	P- 17	22	18	46.184
GROUP D	P- 5	5	1	3.231
	P- 86	6	1	5.902
	P- 57	7	1	6.519
	P- 93	8	2	11.275
	P-110	9	1	11.488
	P-117	10	3	12.603
	P-125	11	2	12.857
	P- 50	12	4	14.610
	P- 35	13	2	14.678
	P-141	14	2	14.755
	P-129	15	4	15.777
	P- 49	16	4	16.411
	P- 90	17	3	17.141
	P- 91	18	6	17.831
	P- 6	19	5	19.412
	P- 63	20	5	19.624
	P- 7	21	5	19.828
	P-134	22	5	19.899
	P-106	23	5	20.136
	P- 99	24	4	21.558
	P- 98	25	5	22.834
	P- 42	26	5	22.959
	P-138	27	6	23.194
	P- 14	28	9	26.068
	P- 36	29	6	28.602
	P-116	30	11	21.789
	P- 81	31	9	33.533
	P- 38	32	3	34.990
	P- 65	33	5	40.174
	P-131	34	5	48.988

Division II—Paper and Board Re-Manufacturing

R- 2	5	2	2.928
R-23	6	4	4.174
R-20	7	6	5.910
R-13	8	2	6.431
R-19	9	3	8.500
R-21	10	6	10.092
R-10	11	6	11.025
R-24	12	6	17.205
R-28	13	11	19.627
R-27	14	9	20.958
R-11	15	3	21.888
R- 9	16	5	22.409
R- 1	17	17	26.313
R-26	18	14	33.805
R- 4	19	6	51.938

June report missing—covers eleven months only: P-121, P-130, P-47, International Paper Co., P-125, P-7, P-65, P-131.

May report missing, as well as June: Extension of time for reporting requested:

P-37, P-34, P-35, P-36, P-39.

Guesswork is good business for fortune tellers but poor practice in making pulp and paper. You want your products to come through clean—free from stains and discoloration caused by rust and other impurities. Make *sure* they look their best by processing them in equipment made of Armco Stainless Steels.

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GREEN BAY READY TO WELCOME TAPPI

WELL known throughout the Middle West for its hospitality—a city modern in every respect yet filled with visible vestiges of early American history—Green Bay, Wisconsin, will extend a hearty and complete welcome to more than 800 visitors during the fall meeting of the Technical Association of the Pulp and Paper Industry, September 8, 9, and 10.

Green Bay has been called the "Plymouth" of the Middle West because of the fact it was just 14 years after the Pilgrim fathers landed that the first white man entered what is now the thriving Wisconsin city exactly 304 years ago. Rich in early Northwest Territory history and boasting many authentic historical sites, Green Bay has much to offer the sightseer. The city of Green Bay is a busy one, but much of the quaintness and historic romance of the early Creole days still remains in and around the city. Tucked in almost forgotten corners can be found settings that remind one of stories of the days when Jean Nicolet made his historic landing in Green Bay. In Green Bay can be found the site of old Fort Howard which passed from French into American hands in 1816—Tank Cottage, the oldest standing building in Wisconsin—the St. Francis Xavier Mission, founded by Father Claude Alouez in 1671—and a multitude of other places and things, all a part of the early beginnings of America. It is, perhaps, significant enough to note that the slogan adopted by this city for the meeting is, "Historic Green Bay Welcomes Tappi."

In addition to these points of interest Green Bay has all the facilities of the ideal convention city. Three railroads and a network of paved highways provide adequate transportation facilities for all visiting members of Tappi while hotel accommodations are of the best. Convention headquarters will be at the Northland Hotel and it has been urged that those planning to attend the convention, write to A. D. Murphy of the Green Bay Association of Commerce or N. L. Malcove of Northern Paper Mills.

Following the outstanding success of its recent fall conventions the Technical Association expects once more to maintain the high standard that it has set for itself. It has been five years since Tappi has held an annual meeting in the midwest, the last one being at Appleton, Wisconsin, in 1933. A beautiful souvenir program will be issued at this meeting.

Featured at the fall convention of the Technical Association of the Pulp and Paper Industry, September 8-10 at Green Bay, Wisconsin, will be papers prepared by the staffs of the Forest Products Laboratory, Madison, Wis-

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consin, and the Institute of Paper Chemistry, Appleton, Wisconsin. The Forest Products Laboratory session will take place on Thursday, September 8, at which time the following papers will be presented: "Effect of Growth Variables in the Pulping of Western Hemlock by the Sulphite Process," by G. H. Chidester and J. N. McGovern; "The Effect of Modified Soda Base Sulphite Liquors in Pulping," by G. H. Chidester and others; "Chemistry of the Alkaline Pulping Processes V. Effect of Chemical Ratio and Initial Concentration on the Rate of Delignification and Hydrolysis," by S. L. Schwartz and M. W. Bray; "The Crystalline Arrangement of Holocellulose," by G. J. Ritter and R. L. Mitchell; "Chemical Composition of Holocellulose," by G. J. Ritter and Wm. Van Beckum; and "Lignin Investigations," by E. E. Harris and others.

Friday, September 9, is the Institute of Paper Chemistry Session and at this time, the following papers will be presented: "Sulphite Pulping of Douglas Fir," by E. B. Brookbank, Jr.; "An Investigation of the Flocculation of Papermaking Fibers," by J. C. Woolwage; "A Fundamental Study of the Removal of the Constituents of Wood in the Alkaline Cooking Process," by F. E. Brauns and W. S. Grimes; "The Influence of Humidity on Changes in Diameter and Length of Sulphite Fibers," by J. P. Widener; and "An Investigation of the Optical Scattering and Absorption Coefficients of Dyed Hand Sheets and the Application of the I. C. I. System of Color Specification to These Hand Sheets," by W. J. Foote.

Papers in the General Session, Saturday, September 10 will include: "The Study of the Absorption of SO_2 in Water," by Charles Reilly, Kimberly-Clark Corporation; "Studies of Formation and Paper Uniformity," by Homer Malmstrom, Kimberly-Clark Corporation; "Data on Heat Exchanger Performance," by B. F. Smith and H. A. DuBois, Kimberly-Clark Corporation; "Steam Generation for Paper Mills," by M. H. Kuhner, Riley Stoker Corporation, Worcester, Mass., and "Steam Power Plant Design and Operation," by A. Kolflat, Sargent & Lundy, Chicago, Ill.

Entertainment for the ladies is in charge of Mrs. H. W. Gochnauer. Golf, bridge, numerous sightseeing trips and theatre parties are planned. For the men the "Program of Fun" will be well nigh endless with fishing, yachting and golf at Oneida making up the chief points of attraction after the business sessions are over. Curly Lambeau, coach of the famous Green Bay Packers, professional football

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team, has notified the committee that a separate section of seats has been set aside for those who will be attending the Tappi convention. This will be the first game of the season and will be with the Cleveland Rams on Sunday, September 11. Convention visitors should make their reservations with Mr. Malcove soon since football is a Wisconsin institution and "standing room only" usually prevails long before the day of each game.

The men's program has been arranged as follows:

On Thursday, September 8, the delegates will visit the Northern Paper Mills, the Hoberg Paper Mills and other Green Bay Industries. The afternoon of the same day, from 2 P. M. until dinner time, will be given over to the technical program, featuring the work being done by the Forest Products Laboratories, Madison, Wisconsin. In the evening the men will join the ladies for the Harvest Festival, dinner and Costume Ball at the Riverside Pavilion.

On Friday morning, September 9, there will be a second technical program featuring the work being done at the Institute of Paper Chemistry, Appleton, Wisconsin. After luncheon the men will indulge in golf and skeet tournaments followed by visits to local industries and to the Institute. At 7:30 P. M. the Formal Banquet will take place at Riverside.

Saturday morning, September 10, will be given over to mill operations papers followed by luncheon at Maxwelton Braes, after which there will be a recreational program. Buffet dinner will be served at Maxwelton Braes and there will be special entertainment.

On Sunday the delegates and visitors will witness the football game between the Green Bay Packers and the Cleveland Rams.

An interesting program has also been arranged for the ladies.

On Thursday, September 8, there will be a luncheon and bridge at the Beaumont Hotel and on the evening of the same day the ladies will join the men for the Harvest Festival at Riverside.

September 9, there will be a bus tour of Cherryland and Door County Peninsula with luncheon on Bay Shore.

Friday morning, September 9, the ladies will be escorted to Nicolet Landing and will have luncheon and bridge at Rockwood Lodge.

On Saturday noon, September 10, there will be golf and bridge at Maxwelton Braes after an historical tour on the morning of the same day.

Every effort is being extended to make the Green Bay Fall Meeting unusually interesting and profitable for all Tappi members and it is urged that those who have not, as yet, made arrangements to attend do so at once.

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▸▸▸ FIFTEEN MEMBERS OF TAPPI recently attended a color seminar at the Institute of Paper Chemistry, Appleton, Wis. Eight states were represented.

◆

CLEVELAND TO BE SCENE OF N. I. A. A. MEET

The 16th Annual Conference of the National Industrial Advertisers Association will be held September 21-23 at the Statler Hotel, Cleveland, Ohio, it has been announced by Stanley A. Knisely, advertising director of the Republic Steel Corporation and vice-president of the Association.

Last September at the Chicago Convention, all former attendance records were smashed with a registration of almost 800 and this year, at Cleveland, a larger attendance is expected.

The N. I. A. A. recently welcomed its 16th local chapter organization, the Mason-Dixon Industrial Advertisers, of which Terry Mitchell, advertising manager of the Frick Company, Waynesboro, Pa., is president.

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PAPERMAKING PATENTS

IN THE UNITED STATES — Compiled by James Atkins, Registered Patent Attorney

Inquiries should be addressed to James Atkins, Munsey Building, Washington, D. C.

Paper Manufacture

Patent No. 2,115,747. Harold Robert Rafton, Andover, Mass., assignor to Raffold Process Corporation, a corporation of Massachusetts. Application January 21, 1933, Serial No. 652,919. 12 Claims. (Cl. 34—24). In a process of manufacturing paper filled with alkaline filler wherein there is provided a water-containing paper web which contains alkaline filler comprising calcium carbonate and rosin sizing, and wherein heat from a heat source above room temperature is supplied to said water-containing web to effect drying thereof, the improvement which comprises maintaining said web, from the time of formation thereof until at least the major part of the drying thereof has been effected, at a temperature not exceeding 75 deg. C.

Method for Removing and Replacing Knives of Paper Cutting Machines

Patent No. 2,113,598. Emil L. Mueller, Rutherford, N. J. Original application March 30, 1935, Serial No. 13,827. Divided and this application August 15, 1936, Serial No. 96,148. 4 Claims. (Cl. 29—84). The method of removing a knife from a paper cutting machine which consists in relatively adjusting an auxiliary support on the bed of the machine beneath said knife and the knife-operating parts of said machine, into position, to support the knife, detaching the knife from the machine and lowering it in the support to clear said knife-operating parts of the machine, meanwhile supporting said auxiliary support and knife on the bed of the machine.

Method of Enhancing the Wet-Strength of Papers

Patent No. 2,116,344. Milton O. Schur, Berlin, N. H., assignor to Brown Company, Berlin, N. H., a corporation of Maine. Application August 4, 1936, Serial No. 94,137. 20 Claims. (Cl. 91—70). In a method involving the impregnation of a fibrous base with aqueous albuminous binder composition and drying such base, that step which comprises exposing the dried impregnated base containing only a small amount of such binder momentarily to a temperature of about 400 deg. to 650 deg. F. in the presence of an insolubilizing agent for said albuminous binder.

Manufacture of Safety Paper

Patent No. 2,112,756. Viktor T. Bausch, Berlin, and Adolf Schroth, Neu-Kaliss, Mecklenburg, Germany, assignors to Felix Schoeller & Bausch, Mecklenburg, Germany. Application June 23, 1936, Serial No. 86,888. In Germany February 7, 1934. 8 Claims. (Cl. 91—67.95). In the manufacture of safety paper for the purpose set forth, the step which comprises treating paper material with a reducible inorganic salt resistant to decomposition by light and which upon reduction forms a substance which is of different color than the original salt, said salt being selected from the group consisting of manganous tellurite, barium tellurite, mercury-I-tungstate and alkali selenite.

Method of Producing Sized Papers

Patent No. 2,114,809. Francis G. Rawling, Piedmont, W. Va., assignor, by mesne assignments, to West Virginia Pulp & Paper Company, New York, N. Y., a corporation of Delaware. Application July 6, 1934, Serial No. 733,963. 15 Claims. (Cl. 92—21). A method of producing a filled and sized paper which includes the steps of thoroughly mixing in a closed vessel at a pH not above 7.0 a pulp suspension, a filler containing calcium carbonate, and sizing ingredients including alum, permitting the carbonate and alum to react to a limited extent to produce carbon dioxide, and preventing the escape from said mixture of substantial quantities of the carbon dioxide so generated to thereby maintain the mixture at a pH not above 7.0.

Paper Making Method and Machine

Patent No. 2,118,491. Harry A. Chuse, Madison, Wis. Application February 6, 1935, Serial No. 5,201. 6 Claims. (Cl. 92—44). In a paper making machine, the combination with a making wire on which the wet sheet is formed, a top wire running in contact with the opposite side of the sheet from that in contact with said making wire, and a series of suction boxes arranged for drawing the sheet alternately against the two wires.

Automatic Steam Control for Paper Machines

Patent No. 2,120,079. Frederick A. Stickle, Indianapolis, Ind., assignor to Stickle Steam Specialties Company, Indianapolis, Ind., a corporation. Application October 2, 1936, Serial No. 103,708. 3 Claims. (Cl. 34—48). Control apparatus for paper machines having drying rolls including a steam line supplying steam to the drying rolls, a valve in said line controlling the flow of steam therein, a tension roll engaging a web of paper passing through said machine and tending to be moved in one direction when said web slackens and in the other direction when said web tightens, a movable member operatively connected to said tension roll and movable thereby, means operatively connecting said movable member and said valve and tending to close said valve when said member is moved in response to a tightening of the web and to open the same when said member is moved in response to a slackening of the web, and a thermostat responsive to the temperature of the steam supplied to said drying rolls and operative connections between said thermostat and said movable member tending to move said movable member in the direction to close said valve when the temperature of said steam increases and to open said valve when said temperature decreases.

Coated Paper

Patent No. 2,119,164. Samuel S. Himmell, New York, N. Y. Application October 28, 1936, Serial No. 107,949. 8 Claims. (Cl. 91—68). A coated and light-permeable paper having a coating on each side thereof, said coating being light-permeable and being of the clay type and being adapted to receive a printed impression, the weight of the coating on each side corresponding substantially to from eight to thirteen pounds per five hundred sheets of paper each of which is twenty-five inches by thirty-eight inches, said coated paper having white and light-permeable paper base stock, said paper base stock having a substantially white marking imprinted thereon, said marking being more opaque than said paper and said coating, said white marking comprising a mixture of white pigment and a smaller proportion of aluminum powder, said marking being covered by the corresponding coating, the proportion of the aluminum powder to the white pigment being such that said marking is substantially invisible by reflected light and visible by transmitted light.

Bleaching and Purifying Process

Patent No. 2,120,678. John L. Parsons and Donald T. Jackson, Erie, Pa., assignors to Hammermill Paper Company, Erie, Pa., a corporation of Pennsylvania. Application March 30, 1936, Serial No. 71,690. 8 Claims. (Cl. 8—108). A method of bleaching and purifying cellulosic material which comprises subjecting the same in a plurality of stages to the action of a plurality of agents having available chlorine, at least one of said agents being in the form of a chlorite selected from the class consisting of an alkali metal and an alkaline earth metal, and another of said agents being in the form of a hypochlorite, the final stage comprising treatment with an alkaline hypochlorite.

A method of bleaching and purifying cellulosic material which comprises subjecting the same to the action of chlorine and then subjecting it to the action of a mixture of a chlorite and a hypochlorite.

Coated Paper

Patent No. 2,119,509. Philip S. Barnhart, Westfield, Mass., assignor to Westfield River Paper Company, Inc., Russell, Mass., a corporation of Massachusetts. Application June 19, 1936, Serial No. 86,082. 4 Claims. (Cl. 91—68). A glassine sheet coated with a composition comprising chlorinated rubber 40-50%, resin, comprising glycerol abietate and para-coumarone, 25-38%, paraffine wax 2-7% and a plasticizer 15-21%.

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TITANOX

GOVERNMENTAL

MIDWEST SHIPPERS ASK FULL ACCESS TO WORLD MARKETS

Assurance of uninterrupted shipment of pulp from European countries direct to ports on the Great Lakes was demanded during a three-day hearing conducted by the United States Maritime Commission during the last week of July in Milwaukee, Wisconsin. Shippers declared that the North Atlantic Shipping Conference, composed of seaboard navigation companies, is hampering developments of Great Lakes-Transatlantic freight service by attempting to regulate traffic in the middle west. Opposition to the conference was expressed by James F. Dougherty of Kalamazoo, Mich., traffic manager of the Michigan Paper Mills Traffic Association. He joined in asking the Maritime Commission to investigate the North Atlantic Conference.

Attorney General O. S. Loomis of Wisconsin demanded full access to the markets of the world and proposed an American fleet to operate between European and Great Lakes ports through the Welland Canal in the St. Lawrence River. "There is Wisconsin's pulp and paper industry," he said, "which is the fourth largest in the state and the third largest in the nation. Transportation facilities are necessary to make it possible to obtain pulp from European markets in addition to domestic pulp. To prevent the fullest use of navigation by water for the transportation of these products will result in a substantial injury, not only upon those industries but upon the welfare and prosperity of the people who are engaged in these industries."

◆

LARGE SHIPMENTS OF PULPWOOD AT ST. JOHN, N. B.

It is reported from St. John, N. B., that according to present estimates, some 96,000 cords of pulpwood will be shipped through that port during the summer, the greater part of which is destined for Germany. The heaviest exporter is the Port Royal Pulp and Paper Company which has increased its volume from an estimated 40,000 cords to 63,000 cords. Other concerns also have increased their shipments over the original estimates.

▸▸▸ MR. JUSTICE GREEN, in a Toronto court, granted three orders allowing G. S. Currie, receiver and manager of Lake Sulphite Pulp Company, Ltd., to sell certain machinery for $1,900, and to sell not more than 11,000 and not less than 9,500 cords of pulpwood at $10.50 a cord. The third order permitted the receiver to acquire a license of occupation at Chubby Harbor.

◆

FTC COMPLETES INVESTIGATION

The field investigation by the Federal Trade Commission of the alleged newsprint monopoly has been completed and a report is now being drafted, it was reported recently.

The report the Trade Commission will give the Department of Justice will trace the background of the newsprint industry and devote much to the Canadian aspects and Southern aspects of the situation, it was said.

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▸▸▸ THE WARD PAPER COMPANY, Merrill, Wisconsin, has been granted a loan of $250,000 by the Reconstruction Finance Corporation at Washington, D. C. No announcement of plans has been made to date with the exception of the company's statement to the RFC that it will add 75 men to its payroll. The company has purchased the former Grandfather Falls Paper Company and has converted it from a newsprint mill to high grade sulphites.

◆

WARNS AGAINST COSTS OF COAL

Millions of dollars of excessive costs for bituminous coal can be imposed on consumers if the National Bituminous Coal Commission does not insist on "reasonable cost" in selling coal, John Carson, Consumers Counsel, warned recently.

"I am confident," said Mr. Carson, "the Commission agrees with me. Where a producer or a number of producers show they can sell coal and do sell it at certain low cost, comparatively, the Commission might well adapt that cost and if any other producer or district wants a 'reasonable cost' at a higher figure, the burden should be on them to prove the higher figure is reasonable. A rule of this kind will save millions of dollars and do no injustice to anyone."

FORESTRY

URGE PERMANENT MANAGEMENT FOR PUBLIC FORESTS

County and other municipal forests and all idle county land should have the benefit of permanent professional management. This might be accomplished in many localities economically by a co-operative arrangement, says the New York State College of Forestry at Syracuse University.

Almost all counties have forests and idle or abandoned land. Many cities, villages and school districts have forests. Some of these properties are large. Usually they are scattered in various sections of the county. Some have been planted recently, but most of the forests were started 10, 15, 20 years ago. These older forests are reaching a period of development which requires professional attention, in fact, both young and old forests need the attention of a forester, and all county land should be handled under a plan to conserve soil and productivity. If these areas are to yield a profit, and in many cases not be lost, some plan should be devised for permanent professional administration to insure fullest development and usefulness.

Today there are almost no foresters taking care of the municipal forests and idle land, which is deteriorating, probably because the expenditure does not seem justified, but two or more

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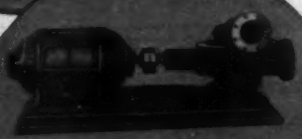

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counties could join and share this expense. In a few cases where a forester has been employed, usually he is under the supervision of a temporary committee of the Board of Supervisors. Politics and changing policy are reflected under this arrangement. Some years it will be good; some bad; some indifferent.

The municipal or community forest should be considered a permanent enterprise, and idle land should be turned into an asset. Wherever such areas exist, it is to the interest of taxpayers to have a permanent board which would employ a forester. One forester might serve two boards. The board should be non-salaried and bipartisan, with expenses paid. The board might consist of three members, with terms of 10 years. Tenure of office could be staggered so the entire board would not go out of office at once. Each member could be nominated and elected by both political parties, or the board could be appointed by the County Judge. This would take forestry out of politics, as far as possible, and make it economical for participating municipalities.

◆

JOINT COMM. ON FORESTRY IS CREATED

A Joint Congressional Committee on Forestry was created under a concurrent resolution enacted at the close of Congress, and is to consist of five senators and five members of the House to be named by the presiding officers of the respective Houses.

This Committee is directed to investigate the present and prospective situation with respect to forest land of the United States, its condition, ownership, and management as it affects a balanced timber budget, watershed protection, and flood control and the other commodities and social and economic benefits which may be derived from such lands.

The Committee appointed pursuant to the concurrent resolution includes Senators McAdoo of California, Smith of South Carolina, Bankhead of Alabama, Pope of Idaho, McNary of Oregon and Representatives Fulmer of South Carolina, Doxey of Mississippi, Pierce of Oregon, Reed of New York and Engelbright of California.

◆

FOREST FIRE RAVAGES B. C.

A disastrous fire has been devastating the Elk Falls district north of Campbell River on Vancouver Island, B. C. Not yet under control at this writing, the fire has spread over more than 100,000 acres of timberland and has wrought damage as yet unestimated. Hundreds of fire fighters worked unceasingly to hold the flames in check but adverse wind conditions impeded their progress. The Canadian destroyers *Fraser* and *St. Laurent*, the Dominion mine-sweeper *Armentiers* and the British cruiser, *York*, stood by at Courtenay to help evacuate residents of the district should this become necessary.

COMING EVENTS

Sept. 5-9—American Chemical Society Meeting, Milwaukee, Wis.

Sept. 8-10—Technical Association of the Pulp and Paper Industry, Fall Meeting, Northland Hotel, Green Bay, Wis.

Sept. 16-17—American Pulp and Paper Mill Superintendents Association, Northeastern Division Meeting, Poland Spring Hotel, Poland Spring, Me.

Sept. 21-23—National Industrial Advertisers Association, 16th Annual Conference, Hotel Statler, Cleveland, Ohio.

Sept. 23-24—American Pulp and Paper Mill Superintendents Association, New York-Canadian Division Meeting, Lake Placid Club, Lake Placid, N. Y.

Oct. 7-8—American Pulp and Paper Mill Superintendents Association, Penn., N. J., Del. Division Meeting, Essex House, Newark, N. J.

Oct. 10-14—National Safety Congress, Stevens Hotel, Chicago, Ill.

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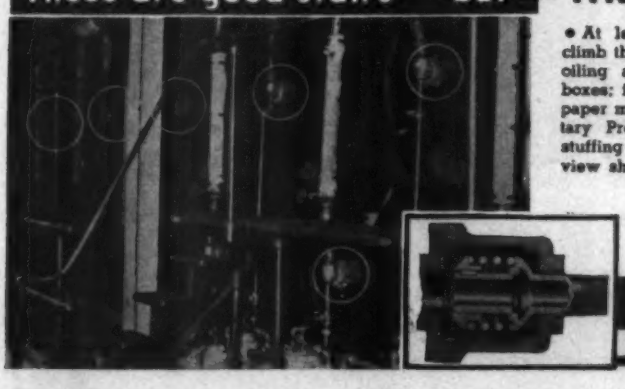

• At least no one will need to climb them for inspecting, packing, oiling and adjusting the stuffing boxes; for this is one of the many paper machines where Johnson Rotary Pressure Joints have ended stuffing box troubles. The sectional view shows the basic construction of these Johnson Joints. Two special, self-lubricating carbon graphite rings form the bearings and pressure seal. Sealed by the pressure, they are self-adjusting. Equally important is the ball and socket design and the annular space around the outlet which provides for angular or lateral misalignment —greatly increasing joint life. There is a Johnson Joint for every machine with every type of drainage—a joint that will save time, power, and step up production. Ask for latest bulletins.

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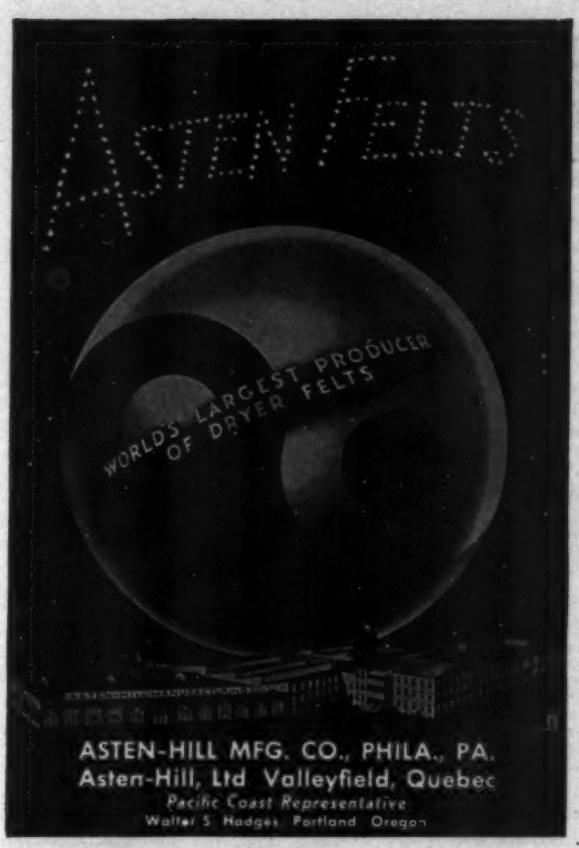
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New Catalogues and Publications

Allis-Chalmers Manufacturing Co., Milwaukee, Wis.—A new bulletin (1653) dealing with this company's line of close-coupled centrifugal pumps covering a range of 10 gpm against 10' head to 1600 gpm 120' head and for lower capacities up to 300' head, has been issued recently. Dimension sheets and useful data in figuring pump installations are to be found in this well-illustrated, 31-page release.

American Standards Association, New York, N. Y.—This association, serving as a clearing house through which industrial, technical and governmental groups develop and co-ordinate their standardization programs in the interest of economy, has recently published its 1938 Yearbook. This 80-page edition contains interesting material regarding the organization of the Association, its activities and in addition lists the various standardizations of various products. Prices for each standard are included in the Yearbook. The range of standards includes: dimensional standards to allow for interchangeability of supplies or to secure interworking of parts of interrelated apparatus; specifications for materials and methods of test; definitions of technical terms used in industry; health and safety codes and specifications for consumers goods sold in retail trade.

Brown Instrument Co., Philadelphia, Pa.—This company has just published a new folder on air-operated controllers which illustrates by photographs and written material, the adaptability of this firm's instruments to the varied control requirements of industrial processing. Several interesting installations are illustrated.

Cameron Machine Co., Brooklyn, N. Y. —Several new bulletins have been released by this firm recently. Bulletin No. CT-338 is a 23-page release containing interesting information regarding the company's mill winders and rewinders. There are many illustrations included in the latter, in addition to diagrams and data explaining the construction and application of the products. Also released lately is the company's Bulletin No. 20-438 which describes the Camachine 20, a winder used in newsprint, book and kraft mills.

Chain Belt Co., Milwaukee, Wis.—A splendid new catalogue entitled *How to Handle It If It Is Wood* has been released lately by this firm. The catalogue, 31 pages in length, shows pictorially just where and how the company's Rex chain and conveyors are used in lumber and pulp mills and portrays specific types of handling methods. Besides the many illustrations showing the uses of the company's equipment, there is much information regarding the equipment itself.

Crane Co., Chicago, Ill.—An 8-page, two-color booklet entitled "Checking Up on Check Valves," has recently been put out by this company. The two basic types of check valves are described, their various applications are discussed and two entire pages are devoted to cross-section views of check valves.

H. B. Dresser Manufacturing Co., Bradford, Pa.—A new 16-page booklet explaining the construction and uses of this firm's No-Thread fittings, has been issued lately by the company. The fittings, described as self-contained pipe joints that connect pipe without threading, are presented herein by means of numerous photographs and drawings, together with clearly-written literature. Specifications and price lists are included in this interesting booklet.

Flexrock Co., Philadelphia, Pa.—A new folder recently released by this concern explains the uses and adaptations of the company's pure asphalt roof coating.

General Electric Co., Schenectady, N. Y.—Two new bulletins have been issued lately by this company. Bulletin GEA-1724 A describes the construction and explains the operation of the complete line of G-E controllers for synchronous motors while Bulletin GEA-2026 A contains information on the operating characteristics, construction and application of the G-E brake-motor. Both bulletins are illustrated and both are punched for loose-leaf filing.

Gifford-Wood Co., Hudson, N. Y.—This company has recently issued a new bulletin (No. 138) on material handling systems, featuring a five-point plan of service to industries. The bulletin illustrates and describes the five essential steps in the selection of handling systems, i.e., survey, design, proposal, installation and maintenance, and illustrates the application of conveying machinery to a wide field of industries.

Green Fuel Economiser Co., Inc., Beacon, N. Y.—A new 36-page bulletin dealing with the types of fans generally used for forced and induced draft has been issued recently by this firm. Characteristics for each type of blade construction are explained in detail and illustrated by characteristic curves. Three common systems of volume control are also explained and illustrated as are details of construction. Included in this release is much information concerning backwardly and forwardly curved blade fans, straight blade fans and multi-blade fans.

International Nickel Co., Inc., New York, N. Y.—Section 1, No. 1, of this company's release, "Nickel Cast Iron Data," contains a guide to the selection of engineering specifications for grey cast iron to secure the properties of density, strength, hardness, rigidity, toughness, machinability, wear resistance and reduction of chill. This publication, a revision of data sheets covering compositions and service data on industrial applications of nickel cast iron, is designed to act as an aid to the engineer or designer in selecting for specification purposes, a range of composition which will produce suitable combination of physical characteristics in a casting of a required thickness of section.

Norma-Hoffmann Bearings Corp., Stamford, Conn.—A new circular issued by this company briefly outlines some results of study in the company's research department in regard to safe-guarding the quality of the company's product in the interval between manufacture and actual application. The circular describes how the bearings are wrapped and otherwise further protected for transit.

Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.—Vol. II, No. II of "The Stainless Fabricator," a publication of this company's alloy steel division, contains several photographs of blow piping manufactured by this firm for an Eastern paper mill.

Pilbrico Jointless Firebrick Co., Chicago, Ill.—This company has recently published a new 40-page catalogue covering the subject of boiler setting construction and refractory linings for horizontal return tubular and other types of fire tube boilers. The catalogue contains many photographs showing installations of the company's products in addition to diagrams and explanatory drawings regarding applications.

Poole Foundry & Machine Co., Woodberry, Baltimore, Md.—An extremely attractive and valuable booklet regarding flexible shaft couplings has recently been published by this company. Seventy pages in length, this spiral-bound, 6¼ x 9¼ inch release contains a wealth of data on the latter subject. There are numerous photographs throughout the issue and the many diagrams and specification tables serve to clarify the whole story of the construction and adaptations of the product. The booklet, bound in blue and stamped in gold, should be a very valuable handbook or guide to add to any industrial library.

Reeves Pulley Co., Columbus, Ind.—A splendid new 124-page catalogue (No. G-384) has just been released by this company. The book, bound in a heavy-weight black cover embossed in gold, contains more than 200 illustrations covering the complete line of the company's variable speed control equipment. The book is printed in two colors and each of the three sections, i.e., variable speed-transmission, variable motor pulley and Motodrive, is printed in a different color combination for ready identification. The book, complete in every way, is spiral-bound and laid out in such a manner as to be as attractive in appearance as it is interesting and concise in content.

Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa.—Vacuum cooling adaptable for either continuous or batch cooling within a range of 35 degrees to 65 degrees Fahrenheit, is described in a new leaflet recently put out by this company. Copies of the leaflet (F.8445) may be secured from the company.

BOOKS

Swedish Timber & Woodpulp Journal, Stockholm, Sweden—The annual issue of the Swedish Timber and Woodpulp Journal 1938 has just appeared and it contains over 252 pages of a great many interesting articles dealing with the technical development of the pulp and paper industries of the Scandinavian countries. The annual number of the Journal is intended to give a survey of the preceding year from commercial and technical points of view, reviewing production, export and import and markets for the various products of the Northern timber, pulp and paper industries. Exclusive technical material and statistical material is included in this issue. Some notes on the U. S. pulp industry in the South is also given. This issue can be obtained from the A/B Svensk Travaru-Tidning, Kungsgatan 17, Stockholm, Sweden. Price is 3s. 6 d., postage included.

Steam Jet Ejector and Vacuum Cooling Section—Heat Exchange Institute has announced the publication of a new section of its standards.

Part One, "Steam Jet Ejectors", covers nomenclature, operating principles, types of assemblies, capacity and standard accessories and materials of construction.

Part Two, "Test Code for Steam Jet Ejectors", covers motive steam, condensing water, vacuum and pressure measurement, capacity measurement, performance tests, diagrammatic arrangements of apparatus for conducting various tests, standard air nozzle orifices and curves on steam flow and air water vapor mixture data.

Part Three, "Steam Jet Vacuum Refrigeration Equipment", covers nomenclature, definitions, performance, construction, standard units and special types.

Copies may be secured from the office of the Secretary, C. H. Rohrbach, 90 West Street, New York, New York. The price is One ($1.00) Dollar.

OTHER COUNTRIES

ITALIAN NEWS

Cellulose Process

After many experiments and numerous practical trials the paper mills of A. Marsoni have applied an important new process for the production of cellulose whereby the raw material is treated while cold with dilute caustic soda solutions to maintain the fibers in their original length. This mill commenced operations in July, 1937, and has a daily production of eight tons which will, however, be raised shortly to 12 tons.

Foreign Commerce

The Italian importations of paper and paperboard which had gone down from 25,317 tons in 1934 to 13,625 tons in 1936, rose to 20,452 tons in 1937. Exportations of paper products which amounted to 8,041 tons in 1936 rose to 18,944 tons in 1937.

▸▸▸ TWENTY NEW PLANTS for the production of cellulose—paperboard, were installed in Italy during the last three years, it was reported recently.

New Pulp Mill

Reports from Milan state that the S. A. Cellulosa d'Italia "Celdit" has been organized for the purchase, installation and operation of a chemical pulp mill in the Italian Kingdom, the Empire and the Colonies, and for the manufacture and trade in chemical pulp and its by-products, according to a report from the American Commercial Attache, Rome.

◆

▸▸▸ GERMANY'S PRODUCTION of chemical pulp has been increased by almost 300,000 tons due to the recent acquisition of Austria. Of the latter amount, about 25,000 tons are sulphate and about 10,000 tons are rayon pulp.

◆

WAR HITS JAPAN'S PAPER PRODUCTION

The Japanese paper industry is being affected materially by current wartime conditions. Output is being restricted, owing to a shortage of pulp supplies, while imports are being held at low levels. The export trade has also been affected by prevailing conditions, although the decline in shipments to foreign countries is not nearly as great as in the case of imports. New capital authorized for investment in the Japanese paper industry during the first quarter of 1938 amounted to only 3,400,000 yen, a decline of 4,500,000 yen from the corresponding total in 1937.

◆

MANCHUKUO MAY PRODUCE RAYON FROM SOYA BEANS

Active steps towards the development of the manufacture of rayon-making pulp from the hulls and stalks of soya beans are now being taken in Manchukuo, according to an item in the *Paper-Maker and British Paper Trade Journal*. According to the report, about 6 million tons of soya bean hulls and stalks are available annually in Manchukuo. The claim is made that pulp produced from soya beans produces a better and stronger rayon thread than does wood pulp.

◆

PLANS UNDER WAY FOR CHILI MILL

Definite plans towards the erection of a new pulp and paper mill in Chili are now under way, it is reported. A new company to be known as the Campania Chilena de Celulosa y Papel is in process of formation and the principal interest behind the new organization is the "Sociedad Imprenta y Litografia Universo," a successful enterprise long established in Valparaiso.

The new mill, to be built near Valdivia on the banks of the Rio Calle Calle, is scheduled to be in operation in about 18 months. It would have an annual capacity of 3,000 to 4,000 tons.

◆

FULL PRODUCTION AT GERMAN MILLS

The first quarter of the year saw continued heavy demand for all products of the German paper industry and the mills, while working to capacity, were unable to meet domestic demands and export orders. In order to be able to meet home demands, a number of concerns were forced to cut down their exports.

ERECT TWO NEW MILLS IN BRAZIL

A new paper mill has been constructed at Apparecida, Sao Paulo, Brazil by the firm, Fabrica de Papel N. S. Apparecida S. A., Rio de Janeiro. The company will manufacture pasteboard and cardboard of all types.

In addition, a new pulp mill is to be erected for the Companhia Sentista de Papel, Sao Paulo. The plant will have a daily capacity of 10 tons of unbleached sulphite, 10 tons of bleached sulphite and 10 tons of mechanical pulp. The pulp, in each instance, will be manufactured from Parana pine.

◆

▸▸▸ *Doctor Fredrik Jahn,* manager-director of the Swedish Paper Mills Association and well-known through the paper industry, celebrated his 50th birthday recently.

◆

▸▸▸ PRELIMINARY PLANS HAVE BEEN MADE by the International Handelsvereeniging Rotterdam, one of the largest trade companies in Netherland Indies, for the construction of a paper mill in Java. No further information concerning the capacity of the mill has been made public but it has been reported that the plant will probably be located at Letjes, near Surabaya, East Java, and that construction will not begin before the beginning of 1939.

◆

JAPAN TO PLANT CHILEAN PINES

A new five-year plan for self-sufficiency in pulp has recently been adopted by the Japanese Government. Under the plan about 10,000 chobu (equal to 24,500 acres) will be reforested. The Department of Agriculture and Forestry will subsidize the raising of young trees required for the reforestation to the amount of 32,000 yen.

A large number of Chilean pines will be planted in Japan to provide a supply of pulp for staple fiber and rayon, according to the *Japan Weekly Chronicle*. It was pointed out that Chilean pines grow about 10 times as fast as Japanese pines and as experiments have been successful, attempts are now being made to plant the Chilean pines on a large scale.

POTPOURRI

PABCO-PARAFFINE CELEBRATES ITS 55TH BIRTHDAY

With the firm's president cutting a candle-laden birthday cake, The Pabco-Paraffine Companies, Inc., one of the Pacific Coast's biggest industrial and pioneer California building materials industry now operating in a world-wide market, celebrated its fifty-fifth anniversary recently.

President William H. Lowe, now in his 35th year with the company, presided over the festivities which honored Secretary R. H. Ohea, with the company forty-two years, representing the office staff; Arthur Harbidge of the factory, with the organization forty-seven years and Miss Mary Krogh, thirty-nine years with the company. The candles on the cake were lit by Miss Ruth Peterson, exposition theme girl.

◆

POUNSFORD HOST TO PUBLISHERS

About 125 publishers, printers and stationers from Western Canada recently visited Port Arthur, Ontario, and inspected the plant of Provincial Paper, Ltd. The visitors were greeted by A. G. Pounsford, general manager, and other officials of the company and were later taken to "Blenwood," the summer home of Mr. Pounsford, for luncheon. Afterwards the guests assembled on the shore of Blend Lake where a program of water and land sports was featured.

▸▸▸ *Harry C. Draper*, K. C., Toronto, formerly assistant deputy minister of Lands and Forests for Ontario, and Mrs. Draper, left towards the middle of July for an extended trip overseas. Mr. Draper will spend some time in Norway, Sweden and Finland. He is now solicitor for the interests of the Mead Corp., Chillicothe, Ohio, for the Huron Products Co. who will undertake developments in the pulp and paper line in Ontario, and for the Detroit Sulphite Pulp and Paper Co., of Detroit.

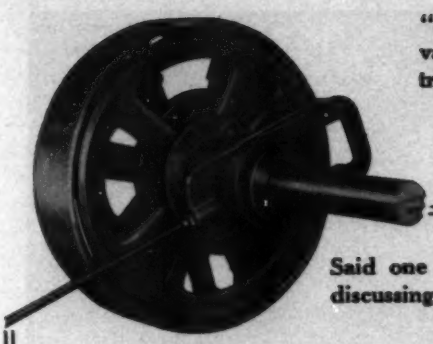
William H. Lowe, president of The Pabco-Paraffine Companies, Inc. (Left to right): Secretary R. H. Ohea, with the company forty-two years; Arthur Harbidge, factory employee with Pabco forty-seven years; Miss Mary Krogh, with the organization thirty-nine years; and Miss Ruth Peterson, San Francisco Exposition theme girl, celebrate the 55th anniversary of the company.

Meet "Fanny" . . . Employee of the Container Corporation of America.

DOG GETS JOB AT CONTAINER CORP. PLANT

That "a man's best friend is his dog," is a well-known adage. Equally well known are the stories of the valuable services rendered by dogs in the Alpine country and various other regions but it is rarely indeed that one hears about a dog actually employed by modern industry in this country. As far as is known, this latter distinction belongs to a German shepherd dog named "Fanny" who is actually in the employ of the Container Corporation of America and whose duties have been described pictorially in the July 25 issue of *Life* Magazine.

According to *Life*, "Fanny" is employed as an A No. 1 rat-catcher at the Circleville (Ohio) strawboard mill of the Container Corporation. In the storage yard are stacked great bales of wheat straw, and between the bales



"It cured our variable speed troubles."

Said one converter discussing our—

VARIABLE SPEED CLUTCH

He used it to replace the slip belt drive, on a Dornbusch Embosser, by means of which the speed of the unit was varied.

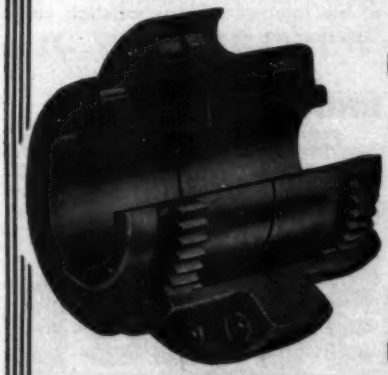
"We run the machine at any speed desired. Start it slow, increase speed as required, and let it operate on long runs with clutch slipping. It does the work better than we ever expected," says this executive.

We will supply name and address if desired. The clutch will solve your troubles just as it did for the above.

HUDSON-SHARP MACHINE COMPANY
Green Bay—Wisconsin

POOLE

FLEXIBLE COUPLINGS



All Metal
Forged Steel
No Welded Parts

•

Oil Tight
Free End Float
Dust Proof
Fully Lubricated

Send for a copy of our Flexible Coupling Handbook

•

POOLE FOUNDRY & MACHINE CO.
BALTIMORE, MD.

ROLL SHELLS

from HEADQUARTERS

THIS 40"x250" suction couch roll shell was made for the Downingtown Mfg. Co. You may not need 40" suction rolls, but your breast rolls, press rolls, wire rolls, felt rolls and coating rolls need Sandusky Shells. They will operate much more smoothly and last much longer. They will stay in shape and stay in balance. They can be reground indefinitely, because Sandusky Centrifugally Cast Shells are sound, dense and uniform throughout.

Sandusky has specialized in shells for paper mill rolls for nearly 30 years. Continuous developments have kept pace with more and more severe physical and chemical service.

When you need rolls—specify Sandusky Centrifugally Cast. Your machine builder can supply them.

Roll Covers, Roll Shells, Pump Liners, Shaft Sleeves, Bushings, Casings, Tubes in Bronze, Iron, Monel and Copper, 3" to 46" diameter—any length.

Write for Illustrated Bulletin No. 537

Sandusky Cast is PRESSURE CAST

Sandusky Foundry & Machine Company

dwell thousands of mice and rats which feed on grains left by the thresher. As the straw is carted away, they go to lower levels, and when the last bales are removed they swarm forth in hordes. Because of this situation the company could find few men willing to move the final bales. It was "Fanny" who solved the situation.

"Fanny" wandered into the yard one day and started to catch rats for fun, but so efficient was she that the company bought her a license and gave her board and lodging and now she is regularly employed. Her record catch is 142 in one day.

◆

EXPOSITION TO FEATURE UNIQUE AVIATION SHOW

When Jim Hawkins, the hero of Robert Louis Stevenson's beloved *Treasure Island*, set out for that fictitious isle he left via the comparatively slow-moving sailing ship of that day. At the forthcoming San Francisco Exposition an analogous process will take place but in a reversed and more modern manner as China Clippers—huge ships of the air—leave from, not for, the Exposition's already far-famed Treasure Island, for the benefit of onlookers and visitors.

This beautiful float was entered by the Champion Paper and Fibre Company in the eleventh Rhododendron Festival parade held June 15 in Asheville, North Carolina. The float is decorated with spruce trees from the company's nursery. The logs of wood and sheets of pulp on the front end represent paper coming from or made out of wood.

Operating a "complete air line under glass," and sending forth huge China Clippers from the heart of the Western World's Fair, Pan American Airways system will bring to the Golden Gate International Exposition in 1939, an exhibit unique in the annals of fairs, aviation and advertising. Crowds will watch the new Boeing 314 Clippers beached and hauled on cradles into the hangar which will be subdivided by a glass partition. From the floor and from an elevated spectator gallery, World's Fair visitors will watch workmen swarming over the big boats and near the glass wall will be the most interesting phases of terminal maintenance and overhaul. Ship-to-shore radio communication will be carried on in full view and on the glass partition will be an animated flight-progress map which will trace the positions of all the Clippers in the Pacific Division of Pan American.

PERSONALS

JENNINGS-RYAN ARE ELECTED TO COLLEGE BOARD

The board of trustees of Lawrence College, Appleton, Wisconsin, has elected Elmer H. Jennings, vice-president and sales manager of the Thilmany Pulp and Paper Company, Kaukauna, Wisconsin, and W. H. Ryan, retired purchasing agent of the Kimberly-Clark Corporation, Neenah, Wisconsin, as new members. They succeed Chief Justice Marvin Rosenberry of the Wisconsin State Supreme Court and Charles S. Boyd, president of the Appleton Coated Paper Company, who have resigned.

◆

TWO PROMOTIONS AT LINK-BELT CO.

Newly appointed western sales manager of the positive drive division of the Link-Belt Company is William W. Bond, who will maintain headquarters at the Dodge plant in Indianapolis. Mr. Bond succeeds G. Howard Burkholder who passed away recently. Mr. Bond has been in the company's employ since 1911, first serving in the engineering department at the Philadelphia plant.

William W. Bond

Ralph S. Dyson

Coincidentally with Mr. Bond's promotion, Ralph S. Dyson, for many years manager of stock silent and roller chain drives through distributors will also take charge of roller chain sales to duplicate machinery manufacturers. Mr. Dyson has been connected with the Link-Belt Company since 1899.

▸▸▸ *Thos. W. Harris, Jr.*, purchasing agent at E. I. du Pont de Nemours & Company, was awarded the J. Shipman Memorial Medal recently. This award is made annually to a purchasing agent who has led in constructive accomplishments. Mr. Harris is chairman of the Fuel Committee of the National Association of Purchasing Agents and has worked for many years in the interests of coal selection and classification.

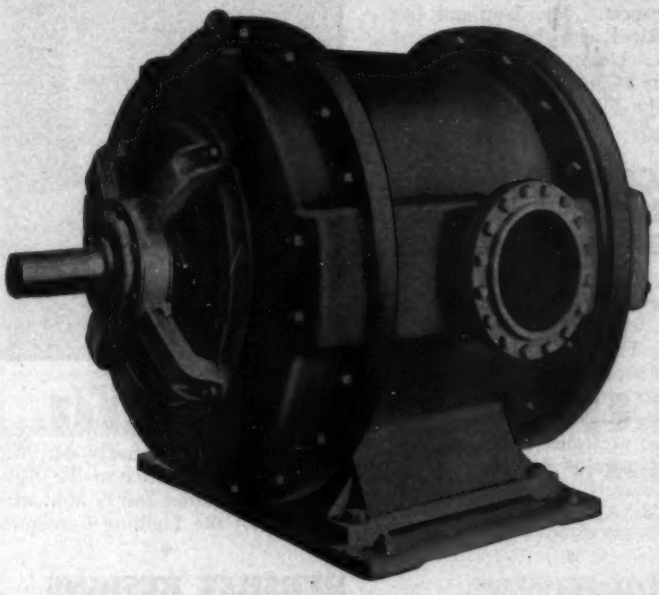
◆

BROWNING PRES. OF UNITED WALL PAPER FACTORIES

The Board of Directors of United Wall Paper Factories, Inc., at a meeting held in New York City, July 22, elected Albert J. Browning of Chicago president of the company. Mr. Browning, formerly group merchandise manager for Montgomery Ward & Company, will assume his new position August 1. His headquarters will be at the company's general offices in Chicago.

Mr. Browning joined Montgomery Ward & Company in 1934. At first manager of the paint department, other lines were later assigned to him, and in December, 1937, he was appointed group merchandise manager. He has

ONLY NASH VACUUM PUMPS HAVE ALL THESE FEATURES.



One Moving Element

Non-Pulsating Vacuum

No Internal Wearing Parts

No Internal Lubrication

Handles Liquid With Air

No Expert Attendance

Constant Efficiency

Low Maintenance Cost

THE NASH ENGINEERING COMPANY

SOUTH NORWALK, CONNECTICUT, U. S. A.

WATERBURY FELTS

Are Made By

H. WATERBURY & SONS CO.

ORISKANY, NEW YORK

High Density BEATERS

Hundreds of highly successful installations in service.

A WORLD OF DIFFERENCE

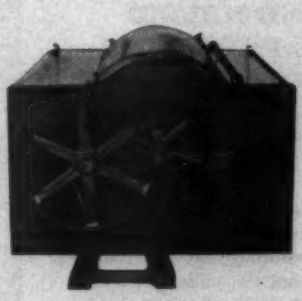
THE MIDWEST-FULTON MACHINE COMPANY
DAYTON, OHIO, U. S. A.

The A. D. Wood Machine

PULP THICKENER — WASHER — SAVEALL
and WATER SCREEN

No Couch Roll or Doctor. Handles variable flows and consistencies. Equipped with patented Double Sealing Collars. Efficient, economical and practically automatic.

Over 30 installed in 1937.



GLENS FALLS MACHINE WORKS, Inc.
GLENS FALLS, N. Y.

Ask for descriptive Bulletin

Albert J. Browning

had charge of the heavy lines, including building materials, hardware, paints, wall paper, house-wares, sporting goods and farm machinery.

Before joining Ward's, Mr. Browning was general manager of the Peninsular Paint & Varnish subsidiary of The Sherwin-Williams Company. After first attending Purdue, and later graduating from the Massachusetts Institute of Technology in 1922, where he specialized in chemical engineering and engineering management, he became associated with the Robertson-Cataract Electric Company of Buffalo and Syracuse, N. Y., and three years later was appointed sales manager by the Intermountain Electric Company of Salt Lake City. At the present time, Mr. Browning resides in Evanston, Illinois.

The retiring president of United Wall Paper Factories, Inc., C. W. Kellogg of Hudson Falls, N. Y., will continue to serve as a director of the company.

◆

GARTLAND NAMED VICE-PRESIDENT OF D. M. BARE

Formerly general sales manager of the D. M. Bare Paper Company, Roaring Spring, Pa., I. L. Gartland has been elected vice-president and director, according to an announcement by Ivan Garver, president. This move was in recognition of Mr. Gartland's outstanding work in modernizing the manufacturing system of the company, it was announced.

Mr. Gartland entered the paper business about 25 years ago as a technician and has since been associated with American and Canadian paper mills. He is the author of many technical papers and during his membership in the American and Canadian Technical Associations and the American Academy of Sciences has presented technical papers on vitally important subjects among which was his article on dialectic papers. Mr. Gartland has been associated with the International Paper Co., Union Bag and Paper Corp., Port Huron Sulphite & Paper Co., and the Fletch Paper Co.

◆

F. BACON NOW PRESIDENT OF COMBINED LOCKS

At a recent meeting of the board of directors of the Combined Locks Paper Company, with offices at Appleton, Wisconsin, Frank R. Bacon of Milwaukee, Wisconsin, was elected president of the latter concern to succeed the late Lewis L. Alsted. Mr. Bacon is president of Cutler-Hammer Company, Milwaukee, manufacturers of electrical controls. He was a brother-in-law of Mr. Alsted and is executor of his estate.

◆

WILLIAMSON NOW VICE-PRESIDENT AT WESTINGHOUSE

Manager of apparatus and supply sales for the Westinghouse Electric Supply Company, Walter Williamson has been elected vice-president of that organization. Mr. Williamson has been actively engaged in the electric supply business since 1910. He was president of the Alpha Electric Company of New York City when that organization was acquired by the Westinghouse Electric and Manufacturing Company in 1926.

I. L. Gartland

Walter Williamson

Undoubtedly one of the most widely known men in the industry, Mr. Williamson has been active in the Agent Jobbers Association and is now active chairman of the Lighting Committee.

◆

HERSHEY RESIGNS POST WITH TVA

John W. Hershey, organizer of the tree crop and forest tree breeding program in the TVA, announced recently that he has resigned August 1st and returned to his home in Downingtown, Pa. The work in which he had been engaged has not only been expressed as one of the most important of all TVA activities by both national and internationally known authors and writers, but the aggressive program pursued and results obtained have stimulated other government agencies along the same line.

Mr. Hershey stated he intended to rest a few months, then offer his services to large land owners as a tree crop consultant.

CORRECTION

On page 488 of the July, 1938, issue of *The Paper Industry and Paper World* an item headed "Cody Resigns From Gaylord Container Corp." contained a statement to the effect that Vertrees Young, executive vice-president of the company, had taken over Mr. Cody's duties until a new general manager could be appointed. It has been since learned that there are to be no changes in the organization and that Mr. Young is to remain permanently in Bogalusa, La.

THE DRAPER FELT

Unexcelled for strength, openness, resiliency, and general running qualities. Made to meet the most exacting conditions on all types of machines and all kinds of papers. Only one grade and that the highest.

Made by

DRAPER BROTHERS COMPANY

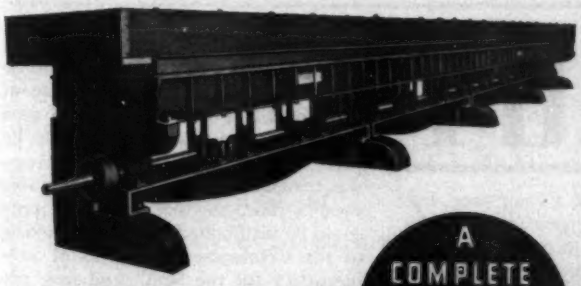
CANTON, MASS.

Woolen Manufacturers Since 1856

REPRESENTATIVES

L. H. BREYFOGLE, Kalamazoo, Mich.

C. K. BEECHER, Delaware, Ohio



A COMPLETE LINE OF FLAT SCREENS

This New Murray Flat Screen is equipped with a special drive developed to meet exacting and heavy duty requirements with high speed. A modern equipment for the mill that must improve quality and cut operation costs to meet all competition. Quiet in operation. Efficient, these screens will do a better job of cleaning your pulp. No vibration, no pounding, no clatter. Highest efficiency, with lowest maintenance and lowest power costs. This drive can also be installed on your present screens. Write for prices on screens you require to modernize your mill. Remember, we make all sizes and types of construction to fit every requirement.

D. J. Murray Mfg. Co.

WAUSAU ~ WISCONSIN.

THE RECORD "INDEPENDENCE" WIRE CABLE PULP WOOD CONVEYOR SPROCKETS FOR UNLOADING AND STORAGE SYSTEMS

These sprockets have CONTINUOUS FLARING RIMS, machined grooves and are provided with REPLACEABLE WEARING SHOES. The FLARING RIMS are a most valuable feature, since should buttons lose spacing from any cause and ride—"WIRE CAN'T COME OFF."

Two wearing shoes are securely locked in dove tail sockets each pocket.

Easily "REPLACEABLE STEEL CABLE GROOVE SHOES" may be furnished to order,—a most economical feature.

Illustrated is a sprocket having pockets pitched at one-half the cable button spacing, permitting use of less costly sprockets and gearing where 4 foot wood is conveyed.

Manufactured by

RECORD FOUNDRY & MACHINE COMPANY

LIVERMORE FALLS, MAINE, U. S. A.

Dr. Edwin C. Jahn

DR. JAHN JOINS FORESTRY COLLEGE

Well known for his research work in the chemical and mechanical utilization of wood, Dr. Edwin C. Jahn has been appointed to succeed Dr. Floyd Peterson as professor in the Pulp and Paper Department of the New York State College of Forestry at Syracuse, N. Y. Dr. Peterson assumed his duties with the Dow Chemical Company on July 1 and is now assistant director of cellulose research at the latter firm.

Dr. Jahn received his master's degree in 1926 at the New York State College of Forestry and his Ph.D at McGill University in 1929. He organized research in the chemical and mechanical utilization of wood at the University of Idaho and during the past eight years has carried on research in fireproofing of fibreboards, physical testing of fibreboards, gelatinization of pulps, chemistry of true fir oleoresin, seasonal distribution of arbogalactan in larch and the plasticization and gelatinization of sawmill wastes.

Dr. Jahn is a member of the American Chemical Society; chairman of the Washington-Idaho Border Section, Technical Association of the Pulp and Paper Industry; Society of American Foresters and the Northwest Scientific Association.

◆

H. MORGAN NOW TECH. DIRECTOR AT MUNISING CO.

Howard W. Morgan, research associate in charge of pulp and paper testing and instructor in pulp and paper technology, resigned, effective August 1, from the Institute of Paper Chemistry, Appleton, Wis., to become technical director of the Munising Paper Company, Munising, Michigan. Before joining the Institute staff four years ago, Mr. Morgan was research engineer at the Oxford Paper Company, Rumford, Me. For the past year he was president of the Lake States Section of Tappi, and is at present serving as chairman of the Testing Division of that association.

Howard W. Morgan

NECROLOGY

DR. CHAS. H. HERTY

Dr. Charles Holmes Herty, the man whose vision, perseverance and technical skill in the development of new uses for slash pine paved the way for one of the greatest industrial and agricultural transformations in the history of the South, passed away July 27 in Savannah, Georgia. He was 71 years of age.

Dr. Herty had been engaged in forestry research since 1892, having graduated from the University of Georgia in 1886 and having taught at the latter institution until the former date. A tireless worker, especially in behalf of scientific utilization of the forest of the South, Dr. Herty has had honor upon honor heaped upon him. Dr. Herty's experiments in making paper, rayon and other products from southern pine pulp at the Herty Foundation Laboratory in Savannah, of which he was executive director, have attracted world-wide interest.

Dr. Herty had been convinced of the value of southern pine in the manufacture of paper for a long time, but it was not until six years ago that he got his opportunity to prove his premise. In 1932 he became director of the division of pulp and paper research of the Georgia State Department of Forestry and Geological Development and this led to the establishment of a laboratory in Savannah in which he perfected his processes. Dr. Herty was convinced that not only was there enough pine, but that a steady supply could be maintained. He was thinking of the development in terms of new industries for the South and new opportunities for Southerners and his researches proved he could supply both. He produced good white paper and newsprint from slash pine and carrying his experiments further, found he could make newsprint from black gum wood. His work with the pine trees produced a fatty by-product useful in the manufacture of sap and his work with the gum trees disclosed a new source of rayon.

Dr. Charles H. Herty

The slight, soft-spoken scientist, who had spent the last several years with the project in which he took his greatest pride—the development of paper and pulp from trees of the Southland—was well-known to thousands the country over. Early this year he was nominated "the man of the year for Georgia and the South." Tribute was paid to the eminent man on many occasions foremost of which was when the Container Corporation plant at Fer-

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INGENIOUS WAY TO FILL PAPER MILL WITH ORDERS

A Paper Mill manufacturing newsprint has an ingenious plan for filling their mill with orders in dull times as well as good times, which can be used to advantage by many Paper Mills.

This Paper Mill will use their Publishing Customers OVER-ISSUE papers, which will be brought to the mill in trucks that were formerly returning empty. These OVER-ISSUE papers will be De-inked to strong pulp, with valuable profit and good saving in Sulphite, and the pulp will be used with their regular furnish.

The Publishers like this arrangement, which is valuable to them, and which at the same time disposes of their OVER-ISSUE papers immediately with greater income (or with credit), and sometimes with saving in warehouse space. The Publishers are concerned about having to get so much paper from foreign mills, and would like to get their paper in the United States.

De-inking the OVER-ISSUE papers is a very ingenius way to fill the Paper Mill with orders in dull times as well as good times. It is an excellent lever in obtaining new customers in publishers now using foreign papers. Also it is good business, as it can be done with valuable profit by APMEW McGregor De-inking Process & System.

The PROFIT from De-inking OVER-ISSUE papers is figured for 20 tons daily at $36,000.00 a year and the saving in Sulphite at $20,400.00 a year, and this repays the investment the first half year and thereafter provides a valuable income.

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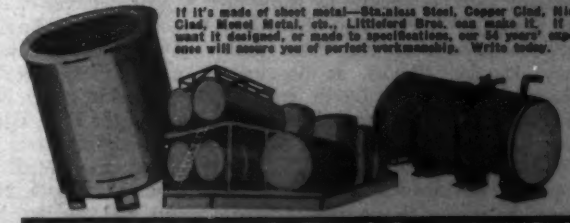

LITTLEFORD BROS. CINCINNATI, O.

nandina, Florida, was dedicated last January (cf. *Paper World*, p. 8, February, 1938).

"As a personal friend of many years," said Georgia's governor, E. D. Rivers, "I feel his loss greatly and as governor I can only point out the great loss suffered by the state. He accomplished wonderful work over great hazards and handicaps that to any less great person would have been insurmountable."

Dr. Herty was married in 1895 to Miss Sophie Schaller, who passed away in 1929. He is survived by a daughter, two sons and a sister.

◆

EMMETT H. NAYLOR

Since 1914 secretary-treasurer of the Writing and Cover Paper Manufacturers' Association, Emmett Hay Naylor died suddenly on July 27 as a result of an accident. Mr. Naylor was found drowned in the swimming pool on his summer estate in Cunningham, Mass., and it is believed that he fainted while swimming.

Mr. Naylor was born in St. Paul, Minn., and was graduated from the Dartmouth College in 1909 and from the New York Law School in 1911. He received an A. M. degree from Harvard in 1912. He was elected president of the American Trade Associations in 1919 and the following year served as president of the Trade Association Executives of New York City. Mr. Naylor also organized and was secretary of the Tissue Paper Manufacturers' Association for ten years. One of the first books on the value of trade associations was written by Mr. Naylor in 1918 but his outstanding work, "Trade Associations—Their Organization and Management," produced in 1921, is still a basic guide for many associations.

Only recently Mr. Naylor had retired from active business (cf. *Paper World*, p. 31, April, 1938) and was succeeded as president of the Writing and Cover Paper Manufacturers' Association by M. C. Dobrow.

Surviving Mr. Naylor are his wife and three children.

◆

W. T. HINCKLEY

Friends in the paper and pulp mill industry will be grieved to learn of the death of W. T. Hinckley, vice-president of Swenson Evaporator Company, Harvey, Illinois, at Bogalusa, La., on July 11th. Death resulted from an accident incurred while swimming.

Soon after graduation from the University of Michigan as a chemical engineer, he entered the employ of Swenson Evaporator Company at Harvey, Illinois, and in 1935 was made a vice-president in recognition of his outstanding service in handling recovery problems in the sulphate process pulp mills. By his concentrated efforts in this field, he achieved important improvements in both equipment and methods, which made him a leading figure in the industry.

Mr. Hinckley is survived by his widow, Mrs. Elizabeth Hinckley.

◆

TOM HARVEY

Widely-known throughout the paper industry, Tom Harvey, general manager of the Chesapeake Paper Board Company, Baltimore, Md., and formerly manager of the Gardner and Harvey Company, Middletown, Ohio, passed away July 13 in Baltimore.

Mr. Harvey who was associated with the Gardner and Harvey Company, predecessor of the Gardner-Richardson Company, for 22 years was known by the entire papermaking industry, not only because of his associations but also by reason of his several inventions and developments. One of the outstanding inventions accredited to him is the Harvey Lewelly paper thickness control. The rotary system of paper manufacture was another idea of his which greatly revolutionized the paper manufacturing business.

Tom Harvey

Mr. Harvey was born in Theale, near Reading, England, in 1868. He learned the rudiments of the papermaking business at Hull, Quebec, where his father became superintendent of the E. B. Eddy Company. Later associations were with the mills of Kalamazoo, Mich., Holyoke, Mass., Chicago, Bogata, N. Y., West Carrollton and finally, Middletown, Ohio, where he joined his brother, George H. Harvey and the late Colin Gardner in the building of what was to become the Gardner and Harvey Paper Company.

Mr. Harvey sold his interests in the Gardner and Harvey firm and became associated with the Chesapeake Paper Board Company in Baltimore.

Mr. Harvey was an active member of the American Pulp and Paper Mill Superintendents' Association. He was a past chairman of the Miami Valley Division, also chairman of the annual convention held in Dayton, Ohio, in 1931.

Surviving Mr. Harvey are his widow, three sons and his mother.

◆

HERBERT M. WILCOX

Herbert Mygatt Wilcox, manager of the New Products Division of the Westinghouse Electric & Manufacturing Company, passed away suddenly July 28, while in New York City on business.

As manager of the newly created New Products Division Mr. Wilcox had played an active part in introducing the Westinghouse precipitron, an electrostatic air cleaner, which is expected to revolutionize the air conditioning industry.

Mr. Wilcox was born in Pittsburgh, Pennsylvania, on November 6, 1882. After attending Princeton University from 1900 to 1902 he transferred to the Massachusetts Institute of Technology from which he graduated in 1905 with the B. S. degree in Chemical Engineering. In 1914 he joined the Winchester Repeating Arms Company where he served as an industrial engineer until 1925 when he became commercial manager for the Western Electric Company. When the latter company created Electrical Research Products, Incorporated, Mr. Wilcox was made vice-president in charge of operations. In 1936 he resigned to join Paramount Pictures Corporation and the following year came to the Westinghouse Company.

◆

CHARLES UNKLE

Superintendent of the Fairfield Paper Company, Baltimore, Ohio, Charles Unkle passed away July 20 at his home in Baltimore at the age of 56.

Mr. Unkle started in the paper manufacturing business about 38 years ago in the mills that have now become the Fairfield Paper Company. He was very active in the establishment of this concern and had been general superintendent for a number of years.

Mr. Unkle is survived by his widow, three sons and two daughters.

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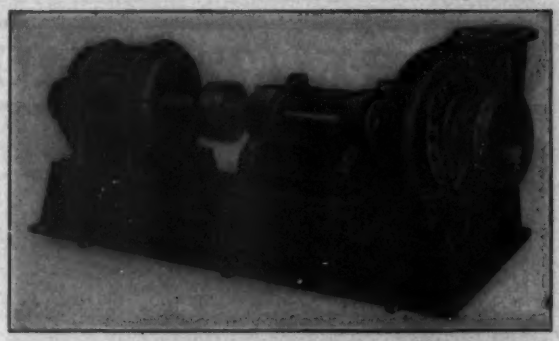

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A large paper manufacturer employing approximately 1,000 workers started an intensive safety program in 1925. During the following eight-year period they reported a $71,000 saving, despite the fact that employment had gradually increased as well as the payments under the State Compensation Law.

FEW executives realize that insurance covers only the direct losses from accidents, or **one-fifth** of the annual bill. As estimated by insurance authorities, the other four-fifths are indirect losses and are not insurable.

If it is important to have protection against 20% of the cost, how much more necessary is it to concentrate on the remaining 80%?

Practical and effective organization for safety as applied by the Paper and Pulp Section of the National Safety Council provides the solution. In the decade 1926-1936 several hundred organizations in this field have, as a group reduced the frequency and severity of accidents 64% and 61% respectively, a savings of millions of dollars within the industry.

A copy of "Organizing a Complete Industrial Safety Program," together with full information will be sent you gladly upon request. Simply drop us a line on company stationery.

PAPER & PULP SECTION NATIONAL SAFETY COUNCIL TWENTY NORTH WACKER DRIVE CHICAGO ILL.

CURRENT MARKET QUOTATIONS

RAGS (Domestic)
f. o. b. New York City

NEW RAGS — *per cwt.*

Blue Overalls	4.75 to 5.00
Corduroy	2.25 to 2.50
Cottons—	
Washables, No. 1	1.65 to 1.80
Fancy Percales	3.00 to 3.25
New Soft Blacks	3.00 to 3.25
New Light Seconds	1.65 to 1.75
New Dark Seconds	1.50 to 1.60
Khaki Cuttings—	
Mixed	3.25 to 3.50
O. D.	3.75 to 4.00
New Canvas	7.00 to 7.50
New Mixed Blacks	2.25 to 2.50
Shirt Cuttings—	
New White No. 1	6.50 to 6.75
Silesias No. 1	3.75 to 4.00
New Unbleached	6.00 to 6.25
Fancy	2.25 to 2.50

RAGS (Domestic)
f. o. b. New York City

OLD RAGS

Roofing— *per cwt.*	
No. 1	1.05 to 1.10
No. 2	.90 to .95
No. 3	.70 to .75
Twos and Blues—	
Repacked	1.50 to 1.60
Thirds and Blues—	
Repacked	1.30 to 1.40
Miscellaneous	1.05 to 1.15
White, No. 1—	
Repacked	3.50 to 3.75
Miscellaneous	2.75 to 3.00
White, No. 2—	
Repacked	2.25 to 2.50
Miscellaneous	1.75 to 2.00

RAGS (Foreign)
ex dock New York City

NEW RAGS — *per cwt.*

New Dark Cuttings	2.25 to 2.50
New Mixed Cuttings	2.00 to 2.25
New Light Silesias	4.25 to 4.50
Light Flannelettes	4.50 to 4.75
Unbleached Cuttings	6.25 to 6.50
New White Cuttings	7.00 to 7.25
New Light Oxfords	3.50 to 3.75
New Light Prints	2.75 to 3.00

RAGS (Foreign)
ex dock New York City

OLD RAGS — *per cwt.*

No. 1 White Linens	7.00 to 7.25
No. 2 White Linens	6.00 to 6.25
No. 3 White Linens	4.75 to 5.00
No. 4 White Linens	3.50 to 3.75
No. 1 White Cottons	4.00 to 4.25
No. 2 White Cottons	3.25 to 3.50
No. 3 White Cottons	2.50 to 2.75
No. 4 White Cottons	2.00 to 2.25
Extra Light Prints	2.50 to 2.75
Ord. Light Prints	2.00 to 2.25
Med. Light Prints	1.75 to 2.00
Dutch Blue Cottons	2.00 to 2.25
French Blue Cottons	2.10 to 2.30
French Blue Linens	2.75 to 3.00
Checks and Blues	1.75 to 2.00
Linsey Garments	1.50 to 1.60
Dark Cottons	1.10 to 1.20
Old Shapperies	1.00 to 1.05

ROPE and BAGGING
f. o. b. and ex dock New York City

Gunny No. 1— *per cwt.*	
Foreign	2.25 to 2.35
Domestic	2.15 to 2.25
Wool Tares— *per cwt.*	
Light	1.70 to 1.80
Heavy	1.90 to 2.00
Bright Bagging	1.50 to 1.60
Manila Rope—	
Foreign	2.50 to 2.75
Domestic	2.50 to 2.75
New Burlap Cuttings	2.25 to 2.40
Jute Threads—	
Foreign	2.75 to 3.00
Domestic	3.00 to 3.25
Strings—	
Sisal	1.40 to 1.50
Soft jute	1.50 to 1.60
Mixed	.50 to .60

WASTE PAPER
f. o. b. New York City

Shavings— *per cwt.*	
White Envp. Cuttings	2.40 to 2.50
Ord. Hard White No. 1	1.75 to 2.00
Ord. Soft White No. 1	1.65 to 1.75
Flat Stock—	
Stitchless	.65 to .75
Overissue Mags	.55 to .65
Solid Flat Book	.45 to .55
Crumpled No. 1	.40 to .45
Solid Ledger Books	1.30 to 1.40
Ledger Stock—	
White	1.10 to 1.20
Colored	.65 to .75
New B. B. Chips	.15 to .20
Manilas—	
New Env. Cuts	1.50 to 1.60
New Cuttings	1.30 to 1.40
Bogus Wrappers	.15 to .20
No. 1 Old Kraft	.60 to .70
News—	
No. 1 Wh. News Cuttings	1.30 to 1.40
Strictly Overissue	.45 to .50
Strictly Folded	.35 to .40
No. 1 Mixed Paper	.12½ to .17½

CHEMICALS
f. o. b. shipping point

Alum (Papermakers)—	
Lump, cwt.	3.40 -
Ground, cwt.	3.15 -
Powdered, cwt.	3.55 -
Blanc Fixe—	
Bulk, ton	42.50 to 45.00
Barrels, pound	.0350 to .0375
Bleaching Powder—	
Drums, cwt.	2.00 to 2.25
Casein (Domestic Standard)—	
Ground (bags), lb.	.08 to .0825
Fine grd. (bags), lb.	.09 to .0925
China Clay—	
Domestic Filler	
Bulk (mine) ton	6.50 to 12.00
Domestic Coating	
Bulk (mine) ton	11.00 to 20.00
Imported (ship side)	
Bulk (lump) ton	14.50 to 24.00
Chlorine—	
Tank cars (wks) cwt.	2.15 to 2.55
Gelatine (silicin) lb.	.42 to .44
Glye. (C.P.) drums, lb.	.1425 to .1475
Litharge, bbl., lb.	.07 to .0725
Rosin (Alum)—	
Savannah, 280 lb. barrel	
E, per bbl.	5.65
F, per bbl.	5.90
G, per bbl.	5.90
WW, per bbl.	7.80
Rosin (Wood), per bbl., carlots	5.05
Salt Cake—	
Dom. bulk (wks) ton	12.00 to 13.50
Imp. bulk on dock—	
(Atl. ports) ton	14.50 to 15.00
Soda Ash—	
Bulk (works) cwt.	.90 to .95
Paper Bags, cwt.	1.05 to 1.30
Barrels, cwt.	1.05 to 1.30
Soda (Caustic)—	
Solid, drums, cwt.	2.20 to 2.30
Ground and flake, drums, cwt.	2.60 to 2.70
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt.	1.65 to 2.00
40 deg., 55 gal. drums, (works) cwt.	.80 to 1.20
Starch—	
Pearl, 140 lb. bags, cwt.	2.65 -
Pearl, barrels, cwt.	2.90 -
Paper (Sp.) bags, cwt.	2.75 -
barrels, cwt.	3.00 -
Sulphur (crude)—	
(mine) bulk, ton	18.00 to 21.00
Talc—	
Dom. 100 lb. bags (mine)	
ton	14.00 to 18.00
Imp. bulk, ton	25.00 to 40.00
Titanium Dioxide—	
Ba. Pig., bbls., lb.	.05½ to .06½
Ca. Pig., bbls., lb.	.05½ to .06½
Zinc Sulphide, bbls., lb.	.09 to .095

CHEMICAL PULP
(Air-dry ton)

Soda (Dom.) del'd. mill— *per cwt.*	
Bleached	2.70 -
Sulphate (Dom.) f. o. b. mill—	
Bleached	2.75 to 3.00
Kraft No. 1	2.00 to 2.25
Kraft, Southern, del.	1.87½ to 2.00
Sulphate (Imp.) on dock—	
Bleached	2.75 to 3.00
Kraft No. 1	1.75 to 2.00
Kraft No. 2	1.60 to 1.75
Sulphite (Dom. & For.)	
On dock—	
Prime bleached	2.50 to 3.00
Prime easy bleach	2.25 to 2.50
Prime strong unbl.	1.90 to 2.15

MECHANICAL PULP
(Air-dry ton)

No. 1 Dom. & Can. (f. o. b. mill) *per ton*	19.00 to 22.00
No. 1 Imp. (On dock)—	
Moist	25.00 to 26.00
Dry	24.00 to 25.00

PAPER
f. o. b. New York City

Boards— *per ton*	
Binders	71.00 to 77.00
Chip	27.50 to 30.00
Chip, sgl. mla. lined	42.50 to 45.00
Coated, white patent	
.016	60.00 to 65.00
.020 and heavier	55.00 to 60.00
Kraft liner	45.00 to 50.00
News	27.50 to 30.00
Book (easel)— *per cwt.*	
No. 1 Glossy Coat	10.50 to 12.25
No. 2 Glossy Coat	9.25 to 10.50
No. 3 Glossy Coat	8.15 to 9.25
No. 4 Glossy Coat	7.65 to 8.75
No. 1 Antique	7.65 to 8.75
No. 2 Offset	7.00 to 8.00
A Grade E. F.	6.80 to 7.75
A Grade Super	7.05 to 8.00
B Grade E. F.	6.25 to 7.25
B Grade Super	6.50 to 7.50
C Grade E. F.	6.00 to 7.00
C Grade Super	6.25 to 7.25
D Grade E. F.	5.70 to 6.75
D Grade Super	5.95 to 7.00
Ivory & India	.50 cwt. extra
Bonds (Rag Content)—	
100% Rag *per cwt.*	
Ext. No. 1	39.10 to 46.00
100% Rag	31.05 to 36.50
85% Rag	
75% Rag	23.60 to 27.75
65% Rag	20.50 to 25.00
50% Rag	17.55 to 21.50
25% Rag	14.65 to 17.75
Regular Colors	1.00 cwt. extra
Heavy Colors	3.00 cwt. extra
Bonds (Sulphite)— *per cwt.*	
No. 1	8.80 to 10.75
No. 2	7.90 to 9.50
No. 4	7.00 to 8.80
Colors	1.00 cwt. extra
Glassine (f. o. b. mill)— *per cwt.*	
Embossed (25 lb. up)	12.25 -
Bleached (25 lb. up)	11.25 -
Unbleach (25 lb. up)	9.50 -
Greaseproof—	
Bleach. (25 lb. up)	9.20 -
Unbleach. (25 lb. up)	8.75 -
Ledgers (Rag Content)—	
100% Rag *per cwt.*	
Ext. No. 1	40.25 to 47.25
100% Rag	32.20 to 37.75
85% Rag	29.90 to 35.00
75% Rag	24.75 to 29.00
65% Rag	21.65 to 26.25
50% Rag	18.70 to 22.75
25% Rag	15.80 to 19.25
Regular Colors	1.00 cwt. extra
Heavy Colors	3.00 cwt. extra
Ledgers (Sulphite)— *per cwt.*	
No. 1	9.95 to 12.00
No. 2	9.05 to 11.00
No. 4	8.20 to 10.00
News— *per ton*	
Rolls (Contract)	50.00 -
Rolls (Spot)	(nominal)
Sheets	58.00 -
Tissues (Carlots)— *per ream*	
Anti-Tarnish M. G.	.75 -
Colored	.875 -
Kraft	.75 -
Manila	.60 -
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.46 -
Napkins, full crepe and emb'sed (12½ lb. to M shts.) per cs.	.52 -
Toilet, Bleached (M shts.) per cs.	4.40 to 5.80
Toilet, Unbleached (M shts.) per cs.	2.75 to 3.90
Towels— *per case*	
Bleached	3.10 to 3.65
Unbleached	1.80 to 3.30
Wrappings (Kraft)— *per cwt.*	
Extra Quality	5.00 to 5.50
Super-Standard	4.50 to 4.75
Northern Standard	4.25 to 4.50
Southern Standard	4.00 to 4.25
Wrappings (Sulphite and Bleached Kraft)— (Rolls, f. o. b. mill)	
Bleached papers—	
M.F. & M.G. Waxing, 20 lb. (Carloads only) *per cwt.*	5.75 -
(10,000 lbs.)	6.00 -
Drug wrapp. 35 lb.	6.00 -
Unbleached Papers—	
Com. Grd. Butch. 40 lb.	4.25 -
No. 1 Butchers	4.50 -
No. 1 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb.	4.625 -
No. 2 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb.	4.375 -
Steam Finish, 50 lb.	3.625 -
Water Finish, 40 lb.	4.25 -
Manilas—	
Envp. Mla., Sub. 16-40 (No. 1)	4.75 -
Envp. Mla., Sub. 16-28 (No. 2)	4.50 -
Envp. Mla. (Prices based on large sheets untrim'd ream-marked, in bdls.)	
Wrapp. Mla. 35 lb. up—	
No. 1	5.00 -
No. 2	4.75 -
M. G. Sulphite (other than Waxing)	
Grade A-35 lb.	5.00 -
Grade B-35 lb.	4.75 -

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CARTHAGE MACHINE CO.

Carthage, New York

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Machinery for Ground Wood and Chemical Pulp

Pulp and Paper Mill Screens

of STAINLESS STEEL—COPPER—BRONZE—MONEL—CHEMICAL RESISTING ALLOYS

Perforations that are accurate in size and alignment

ANY METAL ** ANY PERFORATION

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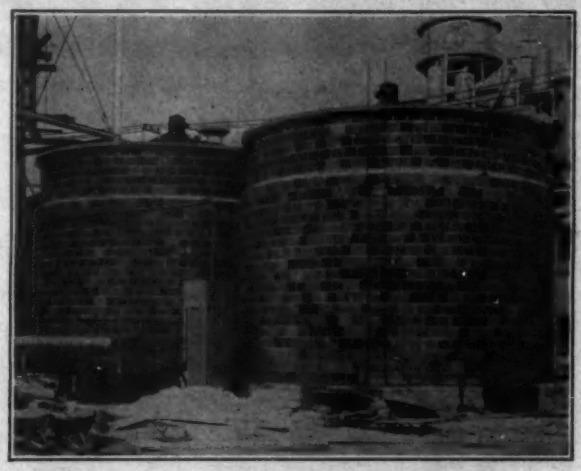

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